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An Address.¹

SOME ASPECTS OF GOITRE IN NORTHERN TASMANIA.

By ALAN PRYDE,

President of the Tasmanian Branch of the British Medical Association.

JUST two years ago, at the instigation of Dr. C. Craig, Surgeon-Superintendent of the Launceston General Hospital, an in-patient goitre clinic was started. Dr. Craig kindly suggested that I should act as surgeon for the first fifty operations. Dr. J. A. Newell is the physician in charge of the clinic and undertakes the overseeing of the pre-operative investigations and treatment. This address is a short summary and commentary on the results of the work during the period covering the fifty operations. This period was from January 20, 1942, to August 13, 1943—not much over eighteen months.

I am giving these dates to emphasize the quantity of material available for investigation at this hospital. We regard this report as merely a pointer for the future. A very small series like this cannot do more than suggest lines of investigation, and we think several such lines are beginning to develop. In five years we could probably have 300 cases, which, if completely investigated as we intend, would form a useful contribution to the subject of goitre in northern Tasmania. Furthermore, as goitre varies in type and toxicity in different countries, it is necessary that we should know our own types, and so far as we know, this aspect has not been investigated here.

Classification of Goitre.

We presumed that the basic pathology of goitre applies everywhere, and we decided to follow William Boyd's

¹ Read at the annual meeting of the Tasmanian Branch of the British Medical Association on February 25, 1944.

classification. Briefly, I shall remind you of his excellent clarification of a very complex subject.

The primary pathological change in the gland is hyperplasia; then follows a stage of involution; and these stages may keep on alternating with corresponding changes in the gland substance. It is the hyperplasia that is responsible for the activity of the gland. Thus, pathologically, we can classify goitre simply into three groups: (i) diffuse goitre with involution; (ii) nodular goitre with either hyperplasia or involution predominant, the nodules being the result of the alternating processes; (iii) diffuse goitre with hyperplasia.

Clinical Classification.

How do these three classes fit in with the clinical types? Reasonably well, if we remember that the hyperplasia is the important factor. The first group includes the simple goitre of adolescence, in which the gland has passed from the stage of active hyperplasia to one of involution. The second group includes nodular goitre with or without toxic signs, according to whether hyperplasia is active or not. The third group includes Graves's disease, in which hyperplasia is the predominant factor.

Our 50 cases (41 among females, nine among males) came into the second and third groups, except for two cases which fell into the first group; these patients were operated upon because the size of the goitre was causing pressure symptoms. Thirty-five cases came into the second group (nodular goitre) and 13 into the third group (Graves's disease). Of the 35 patients with nodular goitre, 12 showed signs of toxæmia before operation. So of the 50 cases, 25 were clinically cases of toxic goitre; 24 of the patients were females, one was a male.

There were two deaths; both patients suffered from nodular goitre.

Nodular Goitre.

A large proportion of the goitres in our series belonged to the second group (nodular goitre), and I should like to discuss our impressions of this type of goitre, as it is our most important problem.

At first we divided nodular goitre into two types, toxic and non-toxic nodular goitre. However, I found that several patients suffering from clinically non-toxic nodular goitre had a post-operative crisis, actually quite severe; that is to say, these apparently non-toxic goitres contained a toxic element waiting to be released as the result of operation. I think that a more correct name is nodular goitre with or without toxic signs. What the element is we do not know; but we have learnt to beware of it in the apparently harmless goitre. That is, I think, our most important lesson from this series. A corollary is our attitude to these numerous nodular goitres; we regard them all as potential dangers, and the only safe procedure is early removal.

The worst post-operative crises followed nodular goitre with toxic signs; the two deaths occurred in cases of the same group. This brings us to the second impression—that obvious toxic nodular goitre constitutes a worse risk than goitre of the third group (Graves's disease). The pre-operative administration of iodine seems to have no effect in reducing the toxicity of the nodular goitre, whereas it has a pronounced beneficial effect in Graves's disease, as is well known. Moreover, iodine given post-operatively appears to be of no benefit in the former group. In fact, toxic nodular goitre has us very worried, and until someone discovers the unknown toxic element in hyperthyroidism and its cure we must be prepared to lose a proportion of patients. However, this very fact has played an important part in our pre-operative treatment; it has caused us to regard every case of goitre as a possibly dangerous one.

If I seem to be over-emphasizing this aspect, I must tell you that during this period two patients died of toxæmia before they could be made fit for any surgical procedure. Also, since the series was completed, another patient has died in post-operative crisis.

In journals recently have appeared reports of the use of thiourea in thyrotoxicosis of Graves's disease. This may indeed be the answer to our prayer. I should like to know what effect it has in nodular toxic goitre.

Pre-Operative Treatment.

Every patient admitted to the clinic undergoes the most complete investigation and treatment. The following are the cardinal points:

1. Complete rest in bed is insisted upon.
2. Body weight is frequently tested. Loss or gain during treatment is perhaps the most vital of all signs.
3. A pulse rate of a "jumpy" type gives a worse prognosis than a higher rate of a steady nature.
4. Repeated hippuric acid excretion tests are performed until 80-90% excretion is attained.

In addition a diet of high caloric value and consisting largely of carbohydrate (including glucose) is given; the aim is to achieve the intake of 3,000 to 4,000 Calories per day. Haemoglobin estimations and basal metabolic rate tests are carried out. Calcium, vitamins (particularly vitamin B), and sedatives are given as a routine measure. Finally, if operation is decided upon, iodine (usually in the form of Lugol's solution) is administered for the final ten days.

The method of "stealing the thyroid" was used on several occasions.

The Hippuric Acid Excretion Test.

The hippuric acid excretion test is proving very useful, particularly when repeated at intervals. We have found that toxæmic patients who on admission to hospital had an excretion of 20-0% (in one case actually nil) increased this steadily during their pre-operative stage.

Several patients with normal hippuric acid excretion had post-operative crises. My explanation in these cases is that the liver function is normal and so can deal with the toxin. When the liver function is lowered, the same amount of toxin may well become overwhelming.

In the two fatal cases in this series the hippuric acid excretion was 75-0% in one and 50-0% in the other. We did not then appreciate the significance of this low percentage. Another patient on admission to hospital had an excretion of 55-0%. Before operation it had risen to 120-0%. She had a severe post-operative crisis. Clinically she had a very toxic nodular goitre, and I think she would have died if she had been operated upon at the time of the first test.

Another patient operated upon early in the series—a male, aged fifteen years, with a huge nodular goitre, and a hippuric acid excretion of 40-0%—had a severe post-operative crisis, but survived.

Geographical Distribution.

Notes of the district from which each patient came, and particularly of the district in which their childhood was spent, are recorded and will eventually be analysed.

Anæsthesia.

Every patient except one (in this case owing to some error in the ward) was given "Avertin" *per rectum*, followed by ethylene by mask inhalation in the early cases. This was replaced by nitrous oxide in the later cases. Dr. L. H. Wilson, the senior resident medical officer, was anæsthetist for most of the patients, as well as supervisor under Dr. J. A. Newell of their pre-operative care. His keenness has been a tremendous asset to the clinic. From the surgeon's point of view, the anæsthesia technique was most satisfactory. I shall, however, have something more to say about it in a few minutes.

Operative Technique.

I have but little to say about operative technique. In the last 30 cases I used cotton ligatures; fine number 50 was used for everything, including vessels in the subcutaneous fat, and number 35 for the superior thyroid arteries. In several cases I used it also for bringing together the separated muscles; that is to say, I used cotton only for the whole operation. It has been a most satisfactory ligature, and I am quite sure the wounds have healed much more quickly than when catgut was used throughout, and also than when linen thread was used.

Post-Operative Routine Treatment.

The post-operative routine treatment was carried out as meticulously as the pre-operative treatment, and I must give due thanks to the resident medical and nursing staffs for care during what can be a very arduous thirty-six hours. Iodine was given liberally by mouth, by rectum, and in addition intravenously, if a crisis occurred. I doubt if it has any effect in the toxic nodular goitre, but I fear to give up anything of remotely possible benefit. Oxygen and morphine were given in full doses; they are our two stalwarts in the defence of the very narrow margin of safety.

Post-Operative Complications.

Post-operative crisis occurred in eight cases; six of these were of nodular goitre, two were of Graves's disease. The most interesting and important fact was the occurrence of a crisis in two cases of apparently non-toxic nodular goitre.

Crisis occurred, then, in four of our 12 cases of nodular goitre in which signs of toxicity were present before operation. It occurred in two of our 23 cases of nodular goitre in which no signs of toxicity were present before operation. It occurred in two of our 13 cases of Graves's disease.

The two deaths which occurred were in cases of nodular goitre, in which signs of toxicity of moderate degree were present before operation. These two and two other cases, also of nodular goitre, which I encountered in private practice at about the same time, all followed a similar course. The condition at the end of operation and for twenty-four hours gave no cause for anxiety. Then the pulse rate and temperature continued to rise, and in spite of all treatment death occurred about fifty hours after operation.

Tetany.

Severe tetany occurred in three cases, two of nodular toxic goitre and one of Graves's disease. Two of the patients first showed definite signs at forty-eight hours, the third (and most severely affected) at the ninth day. In the first two cases the condition cleared up in about six days, much more quickly than in the third case, in which the onset was late. Treatment consisted in the administration of calcium and parathyroid extract.

Cardiac Complications.

In two cases auricular fibrillation developed about thirty-six hours after operation; one was a case of Graves's disease, and the other one of toxic nodular goitre. The latter was the patient who began to suffer from tetany about the ninth day. Both patients responded quickly to digitalis therapy.

Local Anæsthesia.

I discussed the problem of the very toxic goitre with the late Sir John Ramsay, and the interesting fact appeared that twenty-five years ago the great majority of toxic goitres were of the Graves's disease type. In this series there was actually a preponderance of toxic nodular goitre. At this same discussion

Sir John Ramsay suggested that local anaesthesia in the severely toxic case may make just that difference needed to sway the balance over to safety. Following his advice, I have since then operated upon 19 patients under local anaesthesia; four of them had markedly toxic goitre. Not one of them had a post-operative crisis, although three of them could be classified as "bad risks"; in fact, they had a smooth, uneventful recovery.

I am much impressed with the difference in the immediate post-operative appearance and progress of these patients compared with those operated upon under general anaesthesia (ethylene or nitrous oxide). One of these patients with toxic goitre, whose pulse rate was 140 per minute at the commencement of the operation, had a pulse rate of 100 per minute just before leaving the operating theatre, and her pulse rate did not exceed 140 per minute during the following forty-eight hours.

Deep X-Ray Therapy.

As a pre-operative adjunct in the severely toxic cases, our radiologist, Dr. W. P. Holman, suggested a course of deep X-ray therapy. One objection is the time element. A period of two to four months may be necessary for the full benefit of the therapy to be developed, and during this period the patient may die. Of course, patients so treated would have been "hopeless operative risks".

The plan eventually adopted is this. A patient with toxic goitre, who after a week's observation with rest and sedatives is judged to be an exceptionally "dangerous risk", is immediately started on deep X-ray therapy. That is to say, no time is wasted. One must make up one's mind within seven days. All the other routine treatment is given. It may happen that during this eight weeks the patient shows signs of retrogression and the question arises whether it may not be safer to risk operation then rather than wait for the benefit of the deep X-ray therapy. This occurred in one case, and operation under local anaesthesia was successful.

So far, in this series, only one patient has had complete deep X-ray treatment; she was suffering from severe Graves's disease, and became a "fair risk" for operation, which was entirely successful. This also was performed under local anaesthesia.

Our experience, as elsewhere, suggests unfortunately that the nodular type of toxic goitre is unresponsive to X-ray therapy. During this period, of the 14 patients referred for X-ray therapy, 10 were classified as suffering from Graves's disease, and four as suffering from nodular toxic goitre. The general impression gained was that patients with severe Graves's disease do well, sometimes requiring no further treatment, whilst in the so-called early cases, in which diagnosis is doubtful, little improvement is manifested.

Conclusion.

From a survey of this small series of cases arise these suggestions for future consideration.

1. All nodular goitres are prone to toxicity, and early removal seems indicated.
2. The hippuric acid excretion test is a valuable guide to the ability of the liver to combat the thyroid toxin.
3. Local anaesthesia is the anaesthesia of choice in very toxic goitre.

Acknowledgement.

I am very grateful to Dr. R. Y. Mathew, of the Commonwealth Health Laboratory, for his interest and help with the hippuric acid excretion tests, and for the preparation of a series of really beautiful microscopic sections.

ANEURYSM OF THE VENTRICLE OF THE HEART, WITH THE REPORT OF A CASE.

By T. J. F. FRANK,
Melbourne.

The frequency of occlusion of a coronary artery, a well-established clinical entity, has aroused keen interest in its complications and sequelae. Among the less common end-results of myocardial infarction is the development of ventricular aneurysm; in many cases, principally by radiological examination, this diagnosis has been accurately made during life.

Historical Review.

Aneurysm has been defined as a tumour containing blood or blood clot in direct communication with the cavity of the heart, the surface of a valve or the lumen of an artery. Galeati⁽¹⁾ in 1757 recorded the first case of aneurysm of the heart; some doubt exists as to whether this was a true aneurysm, for the term was also used at that time to signify general enlargement of the heart cavities. In the same year, John Hunter⁽²⁾ gave the following description of such a case: "At the apex, it was forming itself into a kind of aneurysm, becoming there very thin: that part was lined with a thrombus just the shape of the pouch in which it lay." Sternberg⁽³⁾ in 1914, could find only three cases of cardiac aneurysm recognized during life, whilst in 1926, Pleinew⁽⁴⁾ found records of only six similar cases. Sézary and Alibert⁽⁵⁾ in 1922, reported the first diagnosis by means of X rays, and from that time onwards numerous cases have been recorded. In 1938, Parkinson, Bedford and Thomson⁽⁶⁾ reported fifteen cases, in 1940, Dressler and Pfeiffer⁽⁷⁾ reported ten cases, whilst in 1941, Fulton⁽⁸⁾ described two cases, one recognized eight to ten weeks and the other two years after the occurrence of a coronary occlusion.

Ætiology.

According to Parkinson, Bedford and Thomson,⁽⁶⁾ aneurysm of the heart may occur in the following conditions: (i) arteriosclerosis, affecting the coronary vessels and resulting in occlusion and myocardial infarction; (ii) syphilis, producing a focal gummatous myocarditis; (iii) infective endocarditis, causing a mycotic aneurysm; (iv) rheumatic carditis, resulting in a necrosis of the myocardium; (v) congenital lesions, such as cardiac diverticula and aneurysms of the membranous part of the septum; (vi) trauma. The most frequent cause of aneurysm of the left ventricle is coronary occlusion; Sternberg⁽³⁾ in 1914 found this basis in 84.8% of 207 cases of cardiac aneurysm, and since that time similar views have been held. Parkinson and Bedford⁽⁶⁾ in 1928, found five cardiac aneurysms at 83 necropsies, whilst Wright-Smith⁽⁹⁾ in 1936, found 13 aneurysms at 87 post-mortem examinations of subjects who had died from extensive myocardial infarction. Parkinson, Bedford and Thomson⁽⁶⁾ suggest that 9% of patients dying from cardiac infarction are found at autopsy to have an aneurysm of the ventricle; this interesting observation should result in its more frequent recognition during life.

Syphilis is an infrequent cause of cardiac aneurysm. Braunstein, Bass and Thomas⁽¹⁰⁾ in 1940, gave a detailed report of a thirty year old Negress who had numerous healed gummata and an aneurysm of the left ventricle, probably formed by rupture of a large gumma into the left ventricular chamber; inclusive of this case, only nineteen proved syphilitic aneurysms have been recorded. Rupture of syphilitic aneurysms is uncommon; according to Solval⁽¹¹⁾ it has been known to occur in only five instances. Gummatous aneurysm of the heart may be asymptomatic and may be discovered only after death, or it may be diagnosed in the same way as those following atheroma of the coronary arteries.

Mycotic aneurysms of the wall of the heart may occur in acute mural septic endocarditis; but they are rare, and this diagnosis is scarcely possible during life.

Rheumatic necrosis is an uncommon cause; Parkinson, Bedford and Thomson⁽⁶⁾ in a series of sixteen cases of cardiac aneurysm, found three due to this cause, all associated with valvular disease. The aneurysm in one case was situated at the apex and in another in the membranous part of the septum, whilst in the third it was basal, lying just below a rheumatic lesion of a bicuspid aortic valve.

Congenital aneurysms are extremely rare and difficult to recognize during life. Hollander and Crawford⁽¹²⁾ in 1940, reported the results of examination of a Negress, aged thirteen years, with a history of cough and palpitation on exertion. X-ray examination revealed a localized bulge on the left border of the heart, whilst a kymograph showed paradoxical pulsation in this area. In the absence of evidence of rheumatism, coronary artery disease and

trauma, it was regarded as congenital in origin, and possibly due to a developmental weakness of the muscle wall.

Traumatic aneurysms are very infrequent. Warburg,⁽¹¹⁾ in 1938, in a series of 197 cardiac lesions due to non-penetrating injuries, found only two or three instances of traumatic aneurysms. O'Farrell⁽¹²⁾ reported a probable traumatic aneurysm in the case of a man, aged fifty-nine years. He considered that the impact of the steering wheel of a motor-car had produced contusion of the heart muscle; no symptoms, however, became manifest until the area of contusion simulated a myocardial infarct, owing to extravasation of blood into the muscle. Later, dilatation of the heart and cardiac failure developed. At post-mortem examination no coronary occlusion was found, but the pericardium at the apex of the heart was thickened, fibrous and adherent, and the size of a crown piece; under this area, the heart muscle was thinned and formed a ventricular aneurysm. No bulging of the ventricular wall was found at autopsy, and consequently this aneurysm could not have been recognized radiologically. French,⁽¹³⁾ in 1911, reported the case of a patient, aged three years, who fell from a third-storey window and died twenty days later, immediately after anaesthesia for reduction of a fracture; it was assumed that the fall had caused a severe contusion of the heart with hæmorrhage into the myocardium, followed by softening, thinning, and finally rupture and the development of a hæmopericardium.

Development.

In this paper an aneurysm following coronary occlusion and myocardial infarction will be described, and consequently further discussion will be limited to this type. Several stages may be recognized in its development: (i) a history of anginal attacks in some cases, (ii) myocardial infarction, (iii) a latent interval, and (iv) often a terminal stage associated with cardiac failure or sudden death. Fulton⁽¹⁴⁾ stressed the fact that an inadequate period of rest after a coronary occlusion may be a possible factor.

Dressler and Pfeiffer,⁽¹⁵⁾ in a series of ten cases, found that in only two was an adequate period of bed rest enforced, whilst in the remaining eight the patients had had only a few days' rest, because the disease was not recognized at that time. Dressler and Pfeiffer conclude that strict and adequate bed rest is not an absolute protection against the formation of cardiac aneurysm. Whether strain is a factor in the production of aneurysm is speculative. In dogs, ligation of the descending branch of the left coronary artery will result in a good scar without thinning, if the animals are rested for six days; however, if they are exercised three days after operation, thin ventricular scars with aneurysmal bulging will occur.

The necrotic muscle of the myocardial infarct is replaced by connective tissue, which in turn becomes converted into a fibrous scar. Calculation of the time interval required for the bulging of a fibrous scar to form an aneurysm will depend on an accurate and reliable history, in addition to frequent and careful examinations. Aneurysms following coronary occlusion have been noted at post-mortem examination within several weeks; but the clinical recognition is usually much longer delayed than this period.

Pathology.

Aneurysms may be situated anteriorly or posteriorly, the position depending on which coronary artery is occluded. Thus an aneurysm following occlusion of the anterior descending branch of the left coronary artery is usually found either at the apex of the heart or on the anterior wall of the left ventricle above the apex. Posterior aneurysms of the heart are rarely seen, although infarction of the posterior wall of the left ventricle frequently takes place. Aneurysms may occur in any part of the left ventricle, and thus involvement of the base or inter-ventricular septum may be seen. In a series of fourteen cases of aneurysm following coronary occlusion in which post-mortem studies were made, Parkinson, Bedford and Thomson⁽¹⁶⁾ found eight aneurysms at the apex, three on the anterior wall of the left ventricle, one involving the apex and anterior left ventricular wall, and two on the posterior wall. Involvement of the right ventricle is

extremely rare, for Legg⁽¹⁷⁾ found only three instances in ninety cases of cardiac aneurysm.

The appearance of an aneurysm varies from a slight bulge to a sacculle communicating with the ventricle by a well-defined neck. Blood clot is usually present in the sac, and it may be laminated and organized as in aortic aneurysm. Sternberg⁽¹⁸⁾ considers external bulging not essential to the diagnosis; he regards as an aneurysm a pouch or small cavity in the heart wall with or without clots. The diameter varies from a few centimetres to almost the same size as the remainder of the heart; in one case, the diameter of the sac was almost sixteen centimetres. The wall of the aneurysm represents a thinned-out, healed scar of dense fibrous tissue, commonly two to four millimetres in thickness; the overlying pericardium is usually adherent to the heart, whilst the remaining heart muscle may be hypertrophied. Complete obstruction with sclerosis and atheroma of the branch of the coronary artery supplying the affected area is noted; in addition, other vessels may be occluded. Calcification in the clot or in the wall of the aneurysm rarely occurs.

Rupture of an aneurysm is uncommon, although rupture of the heart is usually the result of a recent infarction. Benson, Hunter and Manlove,⁽¹⁹⁾ in forty cases of ruptured heart, found an aneurysm in seven cases; in three of these, rupture was due to a superadded recent infarction. Goodall and Weir⁽²⁰⁾ found no case of aneurysm in eighteen cases of ruptured heart.

Patients with these aneurysms die from further attacks of coronary occlusion, from congestive failure or from cerebral embolism. One reason for non-rupture of the heart may be the normal blood pressure, although hypertension may have existed previously. Parkinson, Bedford and Thomson⁽¹⁶⁾ found the average pressure in 45 cases collected from the literature to be 130 millimetres of mercury, systolic, and 75, diastolic.

Diagnosis.

The diagnosis may be established from the following observations: (i) clinical history and course, (ii) physical examination, (iii) X-ray examination. In practically all cases there is a past history of coronary occlusion; the time interval between the development of the aneurysm and its recognition is variable and depends on an accurate history, repeated examination and radiological investigations.

There are no classical clinical signs. Pulsations in the precordial region are helpful, but will vary with the size, site and amount of thrombus in the aneurysm and with the thickness of the chest wall and the lung tissue overlying the heart. Sometimes no pulsations are visible.

In the majority of cases the apex beat is displaced outwards, is diffuse and may be unduly forcible and heaving. At times a separate pulsation is seen above the apex in the region of the left nipple; occasionally pulsation is visible medial to the left mid-clavicular line, especially if the anterior ventricular wall near the septum is affected. In many cases, this pulsation cannot be separated from that of cardiac hypertrophy. The presence of pulsation, occurring above the apex beat, together with a past history of coronary occlusion and significant electrocardiographic changes, should suggest the possibility of aneurysm, provided other causes of forcible thrusts such as hypertension and lesions of the mitral and aortic valves are excluded.

The heart sounds may be normal or faint, or an apical systolic murmur may be present. Several cases have been reported in which a to-and-fro murmur at or above the apex was present, possibly caused by blood flowing in and out of a sacculated aneurysm. The blood pressure as a rule is not elevated.

The electrocardiogram is important in recording evidence of myocardial infarction and in localizing the lesion to the anterior or posterior wall of the ventricle. Parkinson, Bedford and Thomson,⁽¹⁶⁾ in fifteen cases, found in thirteen a T_1 type of curve, in one a T_2 curve and in one a paroxysmal ventricular tachycardia. Eliaser and Konigsberg⁽²¹⁾ regard a heart tracing as helpful in diagnosis and record various electrocardiographic changes as significant.

Radiological examination of the heart has enabled an increased number of aneurysms to be accurately diagnosed. Fluoroscopic screening is essential, for it will reveal the site of the aneurysm and the type of pulsation. Localized aneurysms may be associated with paradoxical pulsation; this finding is not diagnostic, but suggests a weakened area of the heart wall. Occasionally, pulsation over an aneurysm filled with blood clot or surrounded by thickened pericardium is diminished, whilst the heart appears to be enlarged and beats vigorously. At times "the heart may be elongated to the left or may show a broadening of the apex or angulation of the left border, thus producing a square or rectangular appearance".⁽⁶⁾

Aneurysms of the apex of the heart may be difficult to visualize, because the bulge may be obscured by the shadow of the diaphragm; Parkinson, Bedford and Thomson⁽⁶⁾ suggested that this difficulty could be partly overcome by distension of the stomach with gas by means of an effervescent drink.

Fluoroscopic screening enables the best position to be found for taking X-ray pictures. Thus a lesion of the anterior wall is best seen in the antero-posterior and right oblique positions; if the aneurysm projects forwards, either it may appear as a distinct bulge, or more often its upper margin forms a more or less abrupt ledge or shelf on the anterior contour of the heart. Parkinson, Bedford and Thomson⁽⁶⁾ regard this ledge in the right oblique position as one of the most important signs of cardiac aneurysm. If the posterior wall of the heart is affected, an antero-posterior film may reveal a diffuse bulge at the upper part of the left ventricular border and usually separated from it by a notch; these aneurysms are usually situated at a higher level than those on the anterior wall. A film in the left oblique position reveals a posterior projection from the upper part of the left ventricle indenting the barium-filled oesophagus. The density of posterior aneurysms may be the same as, but is frequently lighter than, the cardiac shadow.

Infarction of the membranous septum may yield to form an aneurysm bulging into the right ventricle; this results in gross enlargement of the right side of the heart with no apparent cause.

Sometimes X-ray examination will reveal linear calcification within the left heart border or in the clot. This calcification is limited to the left ventricle and is linear, whereas in chronic constrictive pericarditis the calcification is thicker, more irregular and not restricted to the ventricle.

Kymography has also been used in examination; it will record absence or diminution of movement and even paradoxical pulsations. As has previously been mentioned, these findings are not diagnostic of aneurysm.

In conclusion, repeated fluoroscopic screening will reveal the rate of development and progress of the aneurysm, and it is also the best diagnostic method. Very small aneurysms will escape detection, but any of appreciable size will be recognized. Huyler⁽²³⁾ reported a case of posterior aneurysm of the left ventricle in which the diagnosis had been missed because only postero-anterior films had been taken repeatedly. In routine examination, fluoroscopic screening and the taking of films in various positions should always be employed.

Differential Diagnosis.

Radiological examination will enable the diagnosis to be made from aneurysms of the descending aorta, from enlarged right ventricular conus, from chronic constrictive pericarditis with calcification and from other shadows near the heart, such as dermoid cysts, hydatid cysts and loculated effusions. In addition, a history and electrocardiographic evidence of coronary occlusion are helpful. An aneurysm of the sinus of Valsalva may simulate ventricular aneurysm; but the presence of aortic regurgitation and a positive reaction to the Wassermann test are helpful signs. Parkinson, Bedford and Thomson⁽⁶⁾ state that "between the apex of the heart and the left dome of the diaphragm, there is often seen a small triangular shadow, the para-apical triangle, of less density than the heart and containing fat; this might suggest cardiac aneurysm in a patient who had coronary thrombosis".

Prognosis.

Some patients remain ambulatory for years, their capability for exercise depending on the efficiency of the heart muscle. They are liable to further anginal attacks, coronary occlusion and congestive heart failure. Rupture of the heart wall following myocardial infarction is more likely during the first two weeks, when necrosis and softening of the heart muscle are most pronounced, than when an aneurysm has developed.

In a series of ten cases reported by Dreasler and Pfeiffer,⁽⁷⁾ two sudden deaths occurred and the remainder of the patients lived for periods varying from one to seven years. In Parkinson, Bedford and Thomson's⁽⁶⁾ cases, the period between the diagnosis of cardiac aneurysm and death varied from one week to thirty months, the average being ten months; of the seven deaths, two were sudden, four were due to congestive heart failure and one was due to cerebral embolism. This symptom was noted in three of their fifteen cases; it may suggest the possibility of an aneurysm if it occurs as a late complication of coronary occlusion.

Report of a Case.

The following patient, with an aneurysm of the left ventricle, has been under observation for the past twenty-one months.

Donald C., aged fifty-three years, a shire employee, when first examined on June 7, 1941, had suffered from dyspnoea on exertion and bouts of flatulent dyspepsia, heart burn and mid-epigastric pain during the last nine months. Seven days previously, whilst he was in bed, a severe, agonizing pain occurred and lasted for six and a half hours; the pain was situated midway between the xiphisternum and the umbilicus; it was associated with flatulence and abdominal distension and was regarded as due to an acute attack of dyspepsia. After several days' rest the patient returned to work. After the disappearance of the acute pain, the "left side of the chest" felt tender, and any effort, even that of undressing, caused dyspnoea and precordial pain; these symptoms were relieved by five to fifteen minutes' rest. The heart rhythm became irregular, and the "heavy beating" kept him awake at night. His feet have never been swollen. His appetite has always been good, although at the time of examination he had lost some weight. He was a total abstainer from alcohol, but smoked four ounces of cigarette tobacco per week. Apart from similar dyspepsia seven years previously and "shell shock" in the last war, his past history had been uneventful.

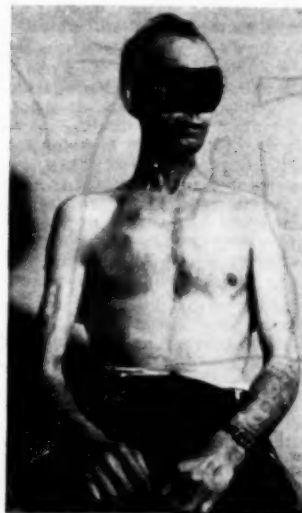


FIGURE 1.

On examination, the patient (Figure 1) was seen to be of slight build and not dyspnoeic. The heart size and sounds were normal; fibrous thickening of the radial arteries was

present, whilst the systolic and diastolic blood pressure readings were, respectively, 140 and 90 millimetres of mercury. The urine contained no albumin and no sugar.

On July 5, 1941, the dyspepsia had decreased; but precordial and left axillary pain, increased heart rate, missed beats and dyspnoea on the slightest exertion were still noted.

When the patient was next seen on August 15, 1941, he reported having had another severe attack of pain two days previously. The pain was situated in the mid-epigastrium between the xiphisternum and the umbilicus; it lasted for several hours and was associated with a feeling of constriction. The heart appeared to be normal in size, and its sounds were regular and clear; the systolic and diastolic blood pressure readings were, respectively, 110 and 75 millimetres of mercury, whilst abdominal examination revealed mid-epigastric tenderness with no rigidity.

On September 3, 1941, to walk a distance of fifty yards produced precordial discomfort and dyspnoea, which were promptly relieved by rest. The apex beat was now five inches from the mid-sternal line in the fifth left intercostal space, pulsation was visible around the left nipple and a mitral systolic murmur was audible. The heart rhythm was regular, whilst the systolic and diastolic blood pressure readings were, respectively, 130 and 95 millimetres of mercury. Apart from liver enlargement, there were no signs of cardiac failure.

The blood yielded no reaction to the Wassermann test, and examination of the optic fundi revealed no changes. An X-ray examination of the chest (Figures II, III and IV), confirmed one month later, showed the presence of an unusually large aneurysm, arising from the anterior wall of the left ventricle and reaching the thoracic wall anterolaterally at the level of the fourth intercostal space; the oesophagus was also displaced to the right. The vascular pedicle was of slender appearance. Radiological examinations after a barium meal and a barium clysm and a cholecystogram revealed no organic lesion; the severe bouts of abdominal discomfort were regarded as being secondary to the myocardial disease.

When next examined on July 6, 1942, the patient reported that his heart still thumped violently, but not to the same extent as ten months previously, when "forcible movements lifted the shirt off the chest wall in the region of the left nipple". In addition, he still had angina of effort, at times pain around the left nipple lasting for days, and occasional attacks of pain between the xiphisternum and umbilicus associated with abdominal distension and relieved by the passage of flatus. There was now a forcible pulsation in the region of the left nipple, the anterior axillary fold and the adjacent left axillary region, approximately 7.5 centi-

regular, the pulse rate was 110 beats per minute, whilst the systolic and diastolic blood pressure readings were, respectively, 130 and 85 millimetres of mercury. There were no signs of cardiac failure. An X-ray examination of the heart on July 7, 1942, revealed enlargement of the

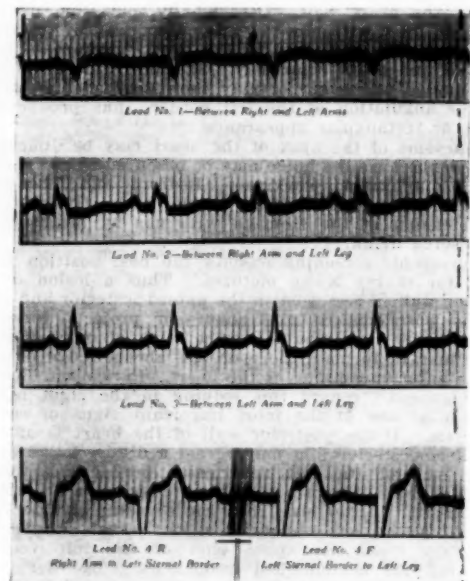


FIGURE V.

left ventricle, from the upper left border of which projected a round swelling, nearly ten centimetres in diameter, situated laterally and slightly anteriorly; it was seen to pulsate, but not synchronously, with the left ventricle; the aorta was normal. Electrocardiograms taken on July 8 and November 19, 1942 (Figure V), revealed right axis deviation and changes in Leads II and III compatible with an old coronary occlusion.



FIGURE II.

Anterior view. Shows enlargement of the heart, especially the left ventricle. The left border of the left ventricle is the site of the aneurysm, its basal portion showing a distinct bulge.



FIGURE III.

Right anterior oblique view. Shows the aneurysmal bulge approaching the chest wall in the region of the fourth left intercostal space.

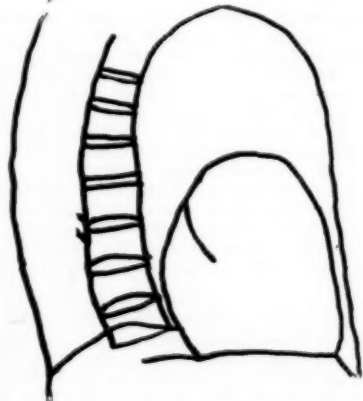


FIGURE IV.

Left lateral view. Shows the cardiac silhouette with the aneurysmal shadow superimposed. The posterior bulging of the heart is due to auricular enlargement.

metres in diameter, and situated above and separate from the apex beat. Loud systolic and diastolic murmurs were audible in this area, especially near the nipple and at the apex, which was palpable in the fifth left intercostal space, 17.5 centimetres from the mid-sternal line. The rhythm was

At his last visit on February 22, 1943, the patient said that he had maintained fair health and still had similar symptoms to those reported on his previous visits. At the present time he is able to walk 600 yards on level ground without distress, but he still requires three pillows for sleep

at night. No changes were noted at clinical and radiological examinations. A kymogram taken in November, 1942, revealed paradoxical pulsation of the aneurysm and practically no pulsation of the apex of the heart; a film in February, 1943, revealed further retrograde changes, as shown by the superimposition of gross secondary indentations on the fundamental "mortise-chisel" excursions in that portion of the left ventricular silhouette which was clearly shown.

Discussion.

Difficulties may arise in the differentiation between coronary occlusion and dyspepsia associated with flatulence, flatus and attacks of severe mid-epigastric pain. In the present case the symptoms referred to the abdomen caused the patient's main discomfort, and it was only subsequently by careful questioning that a history of dyspnoea and angina of effort was elicited. As a result, coronary occlusion was not correctly diagnosed at the onset, and the patient resumed his work without adequate rest. This was possibly one factor in the development of the aneurysm, the other probably being the normal blood pressure. When the blood pressure is elevated and cardiac infarction is present, rupture of the heart is likely to occur rather than stretching of a fibrous scar. X-ray examination, as in the majority of the reported cases, established the diagnosis and the site of the aneurysm on the antero-lateral surface of the left ventricle. In view of the frequency of coronary occlusion with survival, it is suggested that more cases of aneurysm of the heart will be recognized, provided that the chest is examined fluoroscopically and films are taken in more than one plane.

This patient is still alive twenty-one months after his first attack of coronary occlusion and eighteen months after the recognition of his aneurysm. During this period, both the aneurysm and the heart have increased in size. The patient's activities are greatly restricted, since any extra exertion produces dyspnoea and angina of effort.

Summary.

1. A brief review of the aetiology, pathology, diagnosis and prognosis of cardiac aneurysm is given.
2. The principal points in the diagnosis of aneurysm of the heart are the following: a history of myocardial infarction secondary to coronary occlusion of atherosclerotic origin, typical electrocardiographic changes of coronary occlusion, and, most valuable of all, radiological demonstration of the aneurysm.
3. The clinical history of a male patient, aged fifty-three years, with the clinical features and radiological findings of aneurysm of the left ventricle, is reported.

Acknowledgements.

I am indebted to Dr. Frank Stephens for establishing the radiological diagnosis and to Colonel Douglas Thomas for the report on the kymogram. Mr. Tivendale has given valuable help in obtaining numerous kymograms and in preparing photographs of the patient and electrocardiogram. I also wish to thank Dr. Keith Fairley for reading the manuscript of this paper.

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INTERLUDE ON A REEF.

By RICHARD T. KENNEDY.

Gundagai, New South Wales.

IN the year 1858 the mining town of Adelong, New South Wales, had turned from alluvial to quartz mining. The craggy hills were littered with white and yellow mounds of quartz-stone awaiting transference to the crushing machines. These latter comprised an industry in themselves. The proprietors named their machines much as one names ships or racehorses nowadays. Such fascinating names as "The Billabooloolo", "The Leviathan", "The Reefer", "The Wheel of Industry" and the "Great Western" appear in the advertisements of *The Adelong Mining Journal*.

With the petering-out of the alluvial diggings there had also petered out those furious "gold-rushes", and the town had settled down to steady prosperity. The degree of prosperity may be estimated from the fact that *The Sydney Morning Herald* goldfield reporter, after a visit to the area, wrote a most scathing article deploring the awfulness of a state of affairs that allowed of a town boasting but six hotels as against ninety sly-grog shops. Bushranging still flourished, and it was quite the common thing for the "gold escort", a coach with armed troopers aboard, to leave Adelong regularly with two or three thousand ounces of the precious metal.

Amid these surroundings there flourished a small medical fraternity, their status being adequately summed up in the issue of the local journal for November 13 of that year:

We have at present a medical gentleman from the Victoria side and two practitioners who have been on the reef since its discovery, added to which we have the periodical attendance, for consultation, of William Large, Esq., M.R.C.S., an old resident of Tumut and an admirable surgeon.

The "gentleman from the Victoria side" was Dr. Fred Homan, who presents his "card" in the same journal in the following manner:

Dr. Homan has commenced practice in the Cottage in Ryan's paddock near Paul's Hotel, opposite the Government Camp, where he may be consulted daily. N.B.—Member of the Medical Board of Victoria.

It is proposed in this article to follow briefly some of the vicissitudes in the practice of Dr. Homan during his residence on the goldfield.

With the settling down of the miners on the quartz reefs, there came upon them a realization of the necessity for them as a class to protect their own interests against "the squatters" and other parasites who might be out to "take them down". One result was that the miners formed a society to protect themselves from the pecuniary foibles of the local medical gentlemen. This society they christened "The Adelong Gold Miners' Mutual Aid Society". The honorary secretary was a fighting Irishman named John Kennedy. The society which he represented charged the members an entrance fee of five shillings and a weekly contribution of one shilling. In return, an invalided miner was entitled to one pound sterling cash benefit weekly in addition to free medicine and free medical attendance during his illness. Soon after the arrival of Dr. Homan on the goldfield, the bellicose John Kennedy inserted this ukase in the columns of the Adelong weekly:

In the event of any of the members of the above Society requiring medical attendance the Committee particularly request that they will not apply to Dr. Homan owing to the high charges he has hitherto made for attendance.

Now there dwelt in this town a Mr. C. A. Dibdin, one of the "practitioners who had been on the reef since its discovery". He was apparently one of your hail-fellow, slap-on-the-back, cheery dispensers of the healing art, and owing to his gift of rhetoric was much in demand at functions and meetings to "say a few words" or "chair the gathering". Invariably crossing his hands beneath his coat-tails, he would throw out his chest and commence his peroration in his old, familiar style of "Well, me lads!". The public disapproval of Dr. Homan's scale of fees made in the miners' proclamation coincided with a little subtle personal propaganda on the part of old Mr. Dibdin, for Dr. Homan was so stirred as to have the ensuing notice published:

TO THE INHABITANTS OF ADELONG.

Whereas a certain old man, calling himself a doctor, has lately visited my patients unasked, and offered his advice, saying he would make no charge, and at the same time making the most unwarrantable assertion that I, the undersigned, am not a legally qualified medical man, though he has seen my certificate, shown to him on condition that he would produce his, which he never has, I hereby give notice that any party who calls on Mr. Slater at the post office, Adelong, can see my certificate from the Medical Board in Melbourne, and I shall be happy to allow my diplomas to be seen by any person who calls at the cottage where I live in Ryan's paddock.

FRED HOMAN,
Surgeon.

N.B.—Dr. Homan's fees are precisely the same as any qualified medical man in the colony; he therefore begs that the public will not make any comparison between his charges and those of unqualified men, as he is the *only* medical practitioner at Adelong who can produce a diploma!

That the thrust went home to the canny Mr. Dibdin is suggested by the fact that no public reply was made to this hotly worded challenge. Despite this broadside, however, the tormented Dr. Homan was not to be left in peace. A miner named George Coyle chose this strategic moment to begin an attack upon him. Here is Coyle's letter in the journal:

To Messrs. Crouch and Osborne,
Publicans.
Gentlemen,

I beg to tender you my most sincere thanks for your kindness in handing me the proceeds of last Tuesday evening, also to the whole of the audience on that occasion for the liberal support they gave. Of the total amount, £22 8s., which I received, £17 was taken from me by the mercenary doctor who for a short time attended me, who seems rather to believe in drawing from the pocket than treating the flesh; it is now some four months since my leg was broken; from bad treatment it is the opinion of some friends

that amputation will eventually be necessary; my leg is now, there is no doubt, much worse than when first broken. Before the accident occurred, I was strong and hearty. I am not aware of anything that should have impeded its cure, unless it is the unskilful treatment of the said doctor, Member of the Victoria Board!

Kind friends, I make this statement in order to show you that I was not allowed to use the money for the purpose intended, namely, to take me home to my friends; the Wolf Doctor was prowling around for his prey and seized it!

Most truly yours,

GEORGE COYLE.

In this breath-taking announcement, one suspects that the illiterate hand is the hand of Coyle, but that the voice is the voice of that friend who considered "amputation would eventually be necessary"—the voice of Mr. Dibdin.

Poor Dr. Homan was stung to reply:

To the Editor,
Sir,

I wish to call through your paper the attention of the public to an advertisement signed G. Coyle wherein he states that he paid the Victoria doctor £17 for attendance. The simple truth is he paid me £4 for about five weeks' attendance on himself; he also paid me £7 for attendance during a dangerous illness on his sister and £6 he handed over to me which was left by a man who owed it to me. Relative to the part of the advertisement where he speaks of my want of skill, it is only necessary to state that I never saw his leg till four months after the accident occurred.

I am, sir,

Your obedient servant,

FREDK. HOMAN.

It was probably not by accident that at this very troublesome time for Dr. Homan, the wily Mr. Dibdin chose to mislay his text-book on surgery. The insinuation was, it may be certain, not lost upon the furious Dr. Homan. This is how Mr. Dibdin notified his loss in the Press:

Mr. Dibdin requests (politely) that the individual who, during his absence, borrowed his copy of Fergusson's Surgery will return it as soon as he has perfectly studied it!

One can well imagine the derisive laughter at Dr. Homan's expense when the edition of the paper was read around the hotel bars and miners' meetings in Adelong, following this barbed thrust by the miners' friend and champion, good old Mr. Dibdin!

Further testimony to Dr. Homan's being now "*persona non grata*" with the diggers is given, in that the sumptuous dinner held by the members of the Mutual Aid Society to celebrate the first anniversary of that society was graced by Mr. Dibdin, to the total exclusion of Dr. Homan. The venerable Mr. Dibdin in fact proposed two toasts that evening. The first was "The 71st Anniversary of the Colony"—a colony, let it be known, which had shown him domicile for some nineteen years—"during which time he had perceived the natural resources of the land, and when he looked round he saw native youth flourishing, who, if its mind were untrammelled by collegiate education, its heart was free to aid its fellow men! (Cheers.)" It was probably only fitting, in that Mr. Dibdin had been the occasion of considerable advertising revenue and spicy gossip for its columns, that the same gentleman should be entrusted with the toast, "That Mighty Engine, the Press!"

The dissension between the doctors was increased by the necessity that arose at that time under the new electoral act of returning a gentleman, for the southern goldfields, to the future Legislative Assembly. Mr. Dibdin openly identified himself with the miners and Dr. Homan backed the claim of a Mr. Garland. The miners held a meeting to choose a man to represent them. Mr. Dibdin, having been "loud called on" for his opinions, and opening with his famous "Well, me lads", went on to state that when the meeting was called he had no idea of being requested to say anything, nor did he come forward to say much. It was true that he had signed a paper with others to call a meeting, and pleased he was to see such an assemblage that evening. Now they had a franchise,

they ought to maintain it. They were first in the field and ought not to trust to promises of people far, far away, but ought earnestly to take into consideration the proper man to be returned. He would like someone to come forward so that they might not be hoodwinked by the squatters. (Cheers.)

At a meeting to hear Mr. Garland, four days later, Dr. Homan, "amidst hisses and groans", proposed that Mr. Garland was "a fit and proper person to represent the electorate of Tumut in Parliament", a proposal that "was lost by a majority". John Kennedy, the honorary secretary of the Adelong Miners' Mutual Aid Society, who had never evinced any particular love for Dr. Homan, moved instead: "That this meeting, having heard with great pleasure the address of Mr. Garland and having no confidence in any squatter or squatter's friend, decline at present to give him support!" For delicately clad venom Mr. Kennedy's motion takes the prize. The squatter, Mr. Garland, and the squatter's friend, Dr. Homan, must have writhed in misery as the packed meeting roared its raucous approval of Mr. Kennedy's cutting sarcasm. Needless to say, the motion was carried enthusiastically. By now the Adelong citizens, shopkeepers, miners, publicans, squatters and officials were sharply divided as regards both their political and their medical loyalties. And it was at this crucial stage that the Mutual Aid Society advertised in the capital cities and locally for "the services of a properly qualified medical practitioner". The salary offered was £150 per annum, the society's membership being 170. It must have come as a shock to the Adelong practitioners when, at a subsequent meeting, "the secretary, Mr. J. Kennedy, in his usual courteous manner, read the various applications" and the "committee were empowered to secure the services of Dr. Barlas of Melbourne", the professional gentlemen already on the field thus being totally ignored. Dr. Barlas, however, was never fated to take over the duties of medical officer to the Adelong Miners' Mutual Aid Society, and the records do not show for what reason. Suffice it that a further meeting was convened a month later, once again to elect a surgeon, the only candidates for the office on this occasion being Dr. Homan and Dr. Gregory, the latter a modest little man and the other of the "two gentlemen who had been on the reef since its discovery". What had happened to the redoubtable Mr. Dibdin, that his name was not among the candidates for the much-prized honour of attending the members of the society in their days of tears and nights of anguish? Had the old fellow lost his fight and punch? Or had some clammy-handed remorse taken hold of his vitals? The dusty tomes and journalistic archives are strangely silent, so that no precise answer can be given. Speculation alone can avail, together with a short paragraph from *The Adelong Mining Journal*. To my mind this little excerpt throws considerable light upon the enigma:

TWO OF OUR MEDICAL STAFF JAMMED.

One of the most ludicrous affairs—a duel—took place between two of our medical gentry on Friday morning last. Some slight disagreement occurred between the disputants, and nothing but a "gentlemanly" settlement of the affair would satisfy them: accordingly they resorted to pistols and coffee. The battlefield was situated a short distance from the Union Hotel and the weapons of death were charged by one of our brave citizens. Like most honest men he did not like to see the useless spilling of good blood, and therefore substituted a little "black currant" in the place of powder. The terrible moment came and the "potent, grave and hasty seigniors" faced each other, doubting which would first be in the arms of Morpheus. All preliminaries settled, they took their stand, presented arms—and fired! Neither fell and a hearty "Thank God" escaped the combatants simultaneously; the one, owing to some compunctious feelings, discharged his weapon into the air, but the other, with all the determination of his race, gave his enemy the full contents of his pistol, and alas to say, *jammed him from head to foot!* The result was that all parties left the ground well satisfied with the part they had taken, the belligerents shaking hands and laughing heartily at the peculiarity of their own position!

Whether as the outcome of a mutual respect born of this duelling *débâcle*, or from some other cause unknown, it remains to be stated that from then on there is no record of further trouble between the staid Dr. Homan and the doughty Mr. Dibdin. In true fairy-tale fashion they apparently lived happily ever afterwards. Dr. Homan was duly elected over his colleague, Dr. Gregory, to the coveted surgeoncy of the Mutual Aid Society, his erstwhile enemy, Mr. Dibdin, standing down.

Dr. Homan's speech on this happy occasion is outstanding, in that for once he reaches print in the pages of that "mighty engine, the Press", without having so to do through the necessities of adversity. And as evidence that the dove of peace had really rested in the vale of Adelong, let Dr. Homan's words be recorded by none other than Mr. John Kennedy, secretary of the society and one-time bitter opponent of the worthy Dr. Homan. Mr. Kennedy's minutes read:

Dr. Homan came forward and thanked the members for the confidence they placed in his skill, and trusted that as long as he was permitted to attend them, his efforts would prove availing and that nothing should be wanting on his part to render the most speedy assistance whenever required.

Acknowledgements.

Practically all the information for this article has been obtained from the columns of *The Adelong Mining Journal* and *Tumut Express* for the years 1858 to 1860. These were lent to me by Mr. James Vaughan, of Gundagai, printer and ex-newspaper man, who inherited them from the original publishers, Messrs. Morgan and Elworthy, of Adelong.

Miss Ida Leeson has kindly supplied me with copies of portions of the journals which had been somewhat unkindly treated by the ravages of time and silverfish. I am indebted to her, as librarian of the Mitchell Library, Sydney, therefore, and by the same token to the trustees of the same library.

It should be added that all the advertisements and excerpts mentioned in the article are authentic and are to be found in the pages of the journal set out above. A little (I hope forgivable) licence has been taken in the matter of speculating as to the names of the duellists—a not unlikely speculation, I imagine.

GASTRO-ENTERITIS IN CHILDREN: A REPORT ON THE BACTERIOLOGY OF TWENTY CASES CAUSED BY BACTERIUM TYPHI-MURIUM AND TWO CASES CAUSED BY BACTERIUM READING.

By F. DRAPER, B.Sc.,

From the Elder Laboratory, the Adelaide Children's Hospital, Adelaide.

A SEARCH through the literature on gastro-enteritis in children in Australia shows that most attention has been paid to that type known as "summer diarrhoea", which in the majority of cases was due to one of the dysentery organisms. In only one instance was reference made to the *Salmonella* organisms. Harper,⁽¹⁾ in her review of an epidemic of gastro-enteritis in children that occurred in Sydney in the summer of 1930-1931, briefly mentioned the types of *Salmonella* organisms isolated. These were *Bacterium typhi-murium*, *Bacterium newport* and *Bacterium paratyphosum* A and B. (Except where quotations are given, the nomenclature used in this report is that of Topley and Wilson.⁽²⁾) No figures of the incidence of each type or the methods of identification were given.

The diphasic nature of many of the *Salmonellas* and the discovery of new types—some with known flagellar but new somatic antigens and others with known somatic and varying combinations of flagellar antigens—make the complete identification of *Salmonellas* a difficult process. Many special agglutinating sera are needed, and these are not

generally available to routine laboratories. Bornstein⁽²⁾ states that "no laboratory is justified any longer in basing the most frequent and important differential diagnosis, between *S. paratyphi B* and *S. typhi-murium*, upon such inadequate methods as comparing the agglutinative titer in two sera prepared with the respective organisms regardless of phase, or, still worse, upon the clinical picture of the case". Salmonellas isolated from various sources can be identified best by sending cultures to a Salmonella typing "centre", where the necessary sera are available and the latest technical methods used. Such a "centre" has been established at the Institute of Medical and Veterinary Science, Adelaide, by Miss N. Atkinson, who is anxious to receive and report on Salmonellas isolated from any source. The identity of Salmonella types which have been reported must be treated with reserve unless satisfactory methods of identification were used.

In the 22 cases reported in this article, the children were in-patients at the Adelaide Children's Hospital. *Bacterium typhi-murium* was isolated from the faeces of twenty of the children and *Bacterium reading* from the faeces of two others. The first patient was admitted to hospital at the end of June, 1942, and the last in February, 1943. Twelve of the children were admitted suffering from gastro-enteritis and eight suffering from this condition coupled with other infections, and two probably became infected whilst in hospital. Both the last were in a surgical ward and were separated from the gastro-enteritis patients.

Bacterium typhi-murium is a common cause of food-poisoning and is known in most parts of the world, probably because it is a natural pathogen of rodents. For these animals it possesses high invasiveness and virulence. Rodents infected with the organism either develop fatal septicæmia or remain "carriers" for long periods. In man the organism occasionally causes a prolonged fever of the enteric type, but it usually gives rise to acute gastro-enteritis. It is also known as "*Bacillus aertrycke*".

Bacterium reading was first isolated from the water supply at Reading (England) by Schutze, in 1920. It causes gastro-enteritis and Salmonella fever in man.

The Cases Associated with *Bacterium Typhi-Murium* in the Faeces.

Seasonal Influence.

The type of case in which *Bacterium typhi-murium* was isolated from the faeces showed an interesting seasonal incidence. One patient was admitted to hospital at the end of June, 1942, eight were admitted in July, four in August and three in September, and one was admitted in November and one in February, 1943. The two patients who became infected in hospital are not included, and it can be seen that most of the patients were admitted during the wet season. A study of the rainfall figures for the Adelaide district and the number of admissions to the hospital of children suffering from gastro-enteritis (clinical dysentery excluded) during the 1942 winter shows that both were much increased when compared with the figures of the previous and following winters (Table I).

TABLE I.

Year.	May-September Rainfall. (Inches.)	Cases of Gastro-enteritis.	<i>Bacterium</i> <i>typhi-murium</i> Cases.
1941	12.94	36	7
1942	18.48	96	17
1943	8.87	36	0

The improved method of isolating the organism was not introduced until 1942, so that the figures for the number of *Bacterium typhi-murium* cases for 1941 must remain doubtful, although, had they been numerous, some would have been identified by ordinary methods.

Age and Distribution of the Patients.

Fifteen of the children were aged one year or under, two were between one and two years old, and the remaining

three were between two and four years old. None of the babies were breast fed, and most of the children were in that age group in which milk and starch foods are the main items of diet.

The distribution of the cases was widespread, and ranged from the city to nine miles north-west, seven miles south-west and five miles east. The age of the children makes milk the only common article of diet, but the zoning of milk supplies prevents this from being the common vehicle of infection.

Although in only one instance was the organism recovered from two children of the same family, in the families of two other patients a child suffered from diarrhoea and vomiting; but these are not listed, because the organism was not recovered. In the other seventeen cases the only sufferer was the child from whom the organism was isolated, and of these children two became infected in hospital. They had no symptoms of enteritis until they had been inmates for some weeks.

Pathogenic Effects of the Organism.

Diarrhoea was present in the early stages in most cases, and frequent bowel actions usually continued for as long as the child's temperature remained elevated. The faeces at the beginning of the illness consisted mainly of mucus with some pus and blood cells. The pus and blood cells were not so profuse as in cases of early dysentery, and only rarely was sufficient blood present to be seen macroscopically.

Although their stay in hospital varied up to twenty weeks, most of the children were afebrile—that is, their temperature remained below 100° F.—in five to seven weeks. When a longer stay in hospital was necessary, this was either because of the continued presence of the organism in the faeces, or because of supervening infections.

One child died as a result of the infection with the organism, and two others as a result of this and other infections.

The Occurrence of the Organism in the Faeces.

In many of the cases the organism was isolated from the faeces only after repeated attempts. First attempts were often unsuccessful, and it is probable that some cases were missed because only one specimen of faeces was examined. The following example illustrates this point.

A brother and sister were admitted to hospital within two days of each other with the infection. The organism was isolated from the brother during the first week, but not from the sister, who, however, gave a positive "O" and "H" response to agglutination tests in the third week. She was discharged from hospital after seven weeks, but was readmitted nine weeks later with a recurrence of diarrhoea and vomiting. On this occasion the organism was recovered from the faeces; but the agglutination tests produced negative results.

In many cases positive and negative results of faecal examinations were intermingled, and because of this a child was not discharged from hospital until three specimens, usually taken at intervals of three days, were free of the organism.

The organism was recovered from the faeces of three patients up to the sixteenth week and in single cases up to the eleventh, twelfth, thirteenth and fourteenth weeks.

Agglutination Tests with the Patients' Serum.

The children's serum was examined for the presence of "O" and "H" agglutinins.

The "O" suspension was prepared by washing the organisms from a slope culture with absolute alcohol and heating the suspension for thirty minutes at 50° C. After centrifugation, the deposit was suspended in normal saline solution and adjusted to 1,000 million organisms per millilitre. Fresh suspensions were prepared for each batch of tests—usually once a week—and although one strain of the organism was used throughout, the agglutinability of each suspension was not compared with a standard, so that the titres of the various specimens of serum are not strictly comparable.

For the "H" suspension a live culture of the organism was prepared by washing the organisms from an agar slope, suspending them in saline solution and adjusting the strength to 500 million organisms per millilitre. The phase of the organism was not determined.

The examination of the serum was not conducted at regular intervals in the children's illness, and in many cases it was not undertaken until the organism had been recovered from the faeces. Serum from seventeen of the children was examined, and thirteen of these specimens contained the "H" and ten the "O" agglutinin, whereas four contained neither. All the specimens which gave a positive response to the "O" agglutination test also reacted with the "H" suspension. It was found that, as a rule, the "H" agglutinin appeared earlier, reached a higher titre and remained longer than the "O" agglutinin. In one case the "H" agglutinin was present from the second to the seventh week of the child's stay in hospital, whereas the "O" agglutinin was present only in the fourth and fifth weeks. In another case, although the "H" agglutinin was present from the third to the seventh week, the "O" agglutination test produced negative results throughout. In two other cases "H" agglutination tests produced negative results until the sixth week, although serum was examined from the fourth week onwards. In the cases in which neither type of agglutination was found, the serum was probably examined too infrequently. In three cases positive agglutination reactions were obtained before the organism was isolated from the faeces.

The "H" agglutinin was usually absent after the ninth week and the "O" after the sixth week, so that the agglutination test, when its result is positive, is a useful diagnostic measure. The serum of three children who were admitted to hospital suffering from gastro-enteritis gave positive results to agglutination tests; but these cases are not listed, because the organism was not recovered from the faeces.

The highest "H" titres were about one in 640 and the highest "O" titres were about one in 160, but for the reasons given, the value of these figures is limited.

The Value of Treatment with the Sulphonamide Drugs.

All except three of the children were given one of the sulphonamide drugs available at the time; but none was a successful internal disinfectant. Sulphaguanidine was given in six cases, but, with the exception of one, the organism was isolated from the faeces both during and after treatment. In one case this drug had a toxic effect, and the number of leucocytes fell to 3,900 per cubic millimetre; but it rose again after treatment was discontinued. These results are in accord with those of Bornstein and Strauss,⁽⁴⁾ who tested the effectiveness of sulphaguanidine against *Salmonella* organisms *in vivo* and *in vitro*. They concluded that the drug "which is known to be effective in the treatment of bacillary dysentery, is also effective against *S. cholerae suis* and to some degree against *S. paratyphi A*, but ineffective against other organisms of the *Salmonella* group. In fact, in such cases the drug may even be harmful".

Examination of Contacts for Carriers of the Organism.

With the assistance of the local boards of health, who collected the specimens, attempts were made to isolate the organism from the faeces of the members of the children's families. Only six of the families cooperated, but from these one carrier in each of two families was discovered. The organism of one of these was non-motile and partially "rough".

The Antigenic Structure of the Isolated Organisms.

A report on the antigenic structure of the organisms isolated from the children has been included in an article by Atkinson and Woodroffe,⁽⁵⁾ and I am indebted to them for the details used in this section.

The formula of the somatic antigenic structures of *Bacterium typhi-murium* varies. Of the *Salmonella* somatic antigens the IV predominates, and this can be present alone or in combination with the I or the V antigen or with both of these. In the collection of cultures from the patients at this hospital, four had the I, IV, V antigens,

eleven had the I, IV antigens, two the IV, V antigens and three the IV antigen only.

If two members of the same family became infected from the same source, the organism from each should have the same antigenic structure. In the only case in which the organism was recovered from two children of the same family, the organism from one child had the I, IV, V structure, whereas that from the other child had the I, IV formula.

Again, if the children were infected by human carriers, the organisms from the child and the carrier should have the same structure. Both the carriers in this series excreted organisms having the IV antigen only, whereas the organism from one child had the I, IV, V combination and that from the other the I, IV structure.

Two of the children probably became infected in hospital, and they were situated in a ward considerably distant from the ward containing the gastro-enteritis patients. Two other children had excreted organisms with the same antigenic structure (I, IV, V); but of these, one had died and the other had been discharged from hospital six weeks or more before either of the children had become infected.

There are two explanations for these apparent discrepancies. Either the epidemic was caused by four different types of *Bacterium typhi-murium* and the presence of the organisms in the carriers was not connected with the illness of the children, or else the organism in its travels underwent variation in which it gained or lost somatic antigens according to the environment provided by the host.

The Cases Associated with *Bacterium Reading* in the Faeces.

As only two cases in which *Bacterium reading* was isolated from the faeces are available for study, they are described separately. Both children were admitted to hospital in the early part of December, and the subsequent course of the illness was similar to that in the cases due to *Bacterium typhi-murium*.

The first patient was a boy, aged three months, who was admitted to hospital suffering from gastro-enteritis; he had had diarrhoea for six days and vomiting on the last day. The diarrhoea continued intermittently for four weeks and mild vomiting for five weeks after his admission to hospital. The child's temperature became normal in two weeks, and he was discharged from hospital after six weeks. The first specimen of faeces to be examined contained *Bacterium reading*. This specimen was received during the fourth week; none of the next three specimens contained the organism. No sulphonamide drugs were given and no agglutination tests were made on the child's serum.

The other patient was a child, aged one year, who had been ill for ten days before admission to hospital. The illness started with vomiting and fever, with diarrhoea after the first day. After admission to hospital the child's temperature remained elevated for four weeks, diarrhoea continued for five weeks and some vomiting occurred until the seventh week. Sulphapyridine was given for five days in the sixth week. In none of the first three specimens of faeces—one of which contained pus, blood and mucus—was *Bacterium reading* found; but the fourth, obtained two weeks after the child's admission to hospital, contained the organism, which was also isolated on three further occasions. Specimens not containing the organism were obtained between those which did, the last of which was examined in the seventh week. The child was discharged from hospital after eight weeks.

The origin of the infection in both cases is unknown.

Methods of Isolation and Identification of the Organisms.

The specimen of faeces was emulsified in saline solution and a very light inoculum was plated onto MacConkey agar and incubated. If any mucus was present, this was washed in saline solution and plated onto the same medium. In addition, 0.5 grammes of the faeces was inoculated into a tube of tetrathionate broth, which, after incubation overnight, was plated onto MacConkey agar and incubated. Non-lactose-fermenting colonies from the plates were stabbed and streaked onto Kligler's iron agar medium ("Difco"), which is similar to Russell's double sugar medium, but also contains an indicator for detecting

sulphuretted hydrogen. If the organisms gave the reactions of the Salmonella or dysentery groups, they were tested by slide agglutination with the appropriate antisera. The antisera used were those of *Bacterium paratyphosum* A, B, C, *Bacterium typhosum* and the various dysentery organisms. Cultures of the Salmonella organisms were sent to the Institute of Medical and Veterinary Science, Adelaide, for antigenic analysis.

The Value of Tetrathionate Broth.

The formula of the tetrathionate broth was that given by Hynes,⁽⁶⁾ and its use was commenced about six weeks after the appearance of the first case. Comparison of the methods—direct plating and plating after culture in tetrathionate broth—was not started until four months later, when the epidemic was waning. From this time until the time when the last patient was discharged from hospital, five new patients were admitted; in each of these cases the isolation of the organism depended on the culture in tetrathionate broth. Altogether the organisms were isolated 22 times from the tetrathionate broth cultures, and of these examinations only two produced positive results by the direct plating method. In the examination of the contacts for carriers of the organism, the two successful isolations were due to the use of the tetrathionate broth.

Although the figures given are few, they indicate the value of the broth in this investigation, both for the detection of carriers and for the isolation of the organism from the faeces of infected patients.

Discussion.

Although human carriers of *Bacterium typhi-murium* could be responsible for infecting infants, the primary hosts of the organism are rodents, and the vehicle of infection is usually the food. Infants suck their fingers, "dummies", clothing and so on, and infection by human contact would not be difficult. In the cases under review this was an unlikely means of infection, because most of them occurred during the months from July to September. Had human contact been responsible for them, the cases would not have been confined to a few months, but would have occurred more evenly through the year. Two carriers were found in the contacts examined; but in each case the antigenic structures of the organisms of the carriers differed from those of the children. This suggests that infection took place through other channels, the most probable being food contaminated by infected mice.

Bacterium typhi-murium is a natural pathogen of mice, so that there will always be a number of mouse carriers of the organism as well as the infected mice. In normal circumstances these mice would be responsible for infecting infants, but the number of cases would not vary much from year to year. However, an epidemic of "mouse typhoid" in rodents would result in an increase in the number of infected animals, and thus an increase would be expected in the number of cases of gastro-enteritis among children. An epidemic of this type amongst the mice would be reflected by an epidemic of enteritis due to the same organism amongst the cats in contact with the mice.

During 1941 and 1942 the cats of the metropolitan area suffered from an epidemic of enteritis, which caused the death of some hundreds of them. From the autopsy material of one of the diseased cats, *Bacterium typhi-murium* was isolated and identified at the Institute of Medical and Veterinary Science. This epidemic was prevalent in May, 1941, but the total number of cases of gastro-enteritis was not increased during that year, and cases caused by *Bacterium typhi-murium* were not reported until the following year. Other factors must, therefore, be involved.

As a result of the entry of Japan into the war in December, 1941, and of the success of her campaign in the early months of 1942, emergency stocks of food were hoarded in stores and private houses. The extra stocks of food, the dearth of cats and the very wet winter of 1942 combined to make the shelter of the stores and houses very attractive to the rodents. Under these conditions it is not surprising that a great increase in the

number of cases of gastro-enteritis among children should be reported, or that *Bacterium typhi-murium* should be isolated in many of them. When the weather became less rigorous, the incidence of the cases decreased. In the winter of 1943 the hoarding of foodstuffs had practically ceased, the feline population suffered no epidemic and the winter was a fairly dry one. The total number of cases of gastro-enteritis in children in this winter returned to the 1941 level, and *Bacterium typhi-murium* was not isolated from any of them. It seems that the mild outbreak of gastro-enteritis caused by *Bacterium typhi-murium* in the winter of 1942 was determined by several factors, which included a probable epidemic of "mouse typhoid" in mice, a similar epidemic amongst the cats, the hoarding of foodstuffs and the severity of the winter.

The method of food contamination probably differed in each case. As a result of an epidemic of "mouse typhoid", the dust would contain particles of dried faeces from infected mice. If the dust contained living pathogenic organisms, it would contaminate any suitable medium into which it settled, and food-poisoning outbreaks would be fairly numerous. However, the more obvious method of contamination would be that effected by the soiling of saucepans and dishes by droppings from infected mice.

It is well known that infants are particularly susceptible to infection by many Salmonella organisms. This susceptibility could be due to the lower resistance of children to infection, or, owing to variation of some factor, to an increase in the infectivity of the organism. In the cases cited here, although it is unlikely that the only food liable to contamination was that of the child, none of the adults had a history of gastro-enteritis. Cases of food-poisoning caused by *Bacterium typhi-murium* are not uncommon, and in these the organism shows no selective action, but attacks all who partake of the food containing it. For this reason the medium in which the organism multiplies must have some influence on the selection of the victims. Jordan and Burrows,⁽⁷⁾ by cultivation in a custard and starch medium, converted a non-toxicogenic strain of *Bacterium typhi-murium* into a toxicogenic strain. They fed the filtrates in which the organism had grown to monkeys. In the first instances no harmful effects were observed; but after several subcultures into the same medium the filtrates caused symptoms of gastro-enteritis. These experiments could be used to explain the selective action of the organism towards infants. The diet of the infants, none of whom were breast fed, consisted of milk and starch foods, which provide a suitable medium for the production of toxicogenic strains of the organism.

The irritation caused by the toxic products of the organism could be a beginning for the formation of a primary focus, from which, if the organism was able to invade the tissues and multiply in them, an infection could arise.

Summary.

1. Bacteriological findings in twenty cases of gastro-enteritis caused by *Bacterium typhi-murium* and in two cases caused by *Bacterium reading* are reported.
2. The importance of full antigenic analysis for the identification of Salmonella types is stressed.
3. The majority of the patients in the *Bacterium typhi-murium* cases and both the patients in the *Bacterium reading* cases were aged one year or under.
4. As a result of the infection, three children died and others required attention in hospital for periods up to twenty weeks.
5. *Bacterium typhi-murium* was present in the faeces of some patients for sixteen weeks.
6. The agglutination test with the "H" suspension of *Bacterium typhi-murium* is a useful diagnostic aid in that type of infection.
7. The common sulphonamide drugs—including sulphaguanidine—were of no value in eliminating *Bacterium typhi-murium* from the intestine.
8. Two human carriers of *Bacterium typhi-murium* were discovered.
9. The somatic antigenic structure of the types of *Bacterium typhi-murium* isolated placed them into four groups.

10. Tetrathionate broth was a valuable aid for isolating the *Salmonella* types reported.

11. The mild outbreak of gastro-enteritis caused by *Bacterium typhi-murium* was probably due to a combination of factors, of which some were an epidemic of "mouse typhoid", a similar epidemic amongst the cats, the hoarding of foodstuffs and the severity of the winter.

12. The possibility is discussed that the infectivity of *Bacterium typhi-murium* is determined in part by the medium in which it multiplies prior to ingestion.

Acknowledgement.

I wish to thank Miss N. Atkinson for help and friendly criticism in the preparation of this manuscript.

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Reports of Cases.

PNEUMOCOCCAL MENINGITIS TREATED WITH PENICILLIN.

By DONALD VICKERY and LINDSAY DEY,
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Clinical Record.

P.H., aged six years and ten months, was admitted to Wade House, Royal Alexandra Hospital for Children, Sydney, on June 17, 1943. His approximate weight on his admission to hospital was 48 pounds. He had had a slight cough and upper respiratory tract infection for one week, when suddenly he developed a temperature of 105° F., vomited and became drowsy.

On his admission to hospital the child was quite rational, but he looked toxæmic, and his tongue was heavily coated. There was no complaint of headache. His temperature was 102.4° F. and his pulse rate 136 per minute, and respirations numbered 36 per minute. The throat was injected, and a mucopurulent post-nasal discharge was present. There was some puffiness of the left upper eyelid. No neck stiffness was noted, Kernig's sign was not elicited, the ear drums were not inflamed and the chest examination revealed no abnormality. A provisional diagnosis of acute upper respiratory infection with possibly complicating ethmoiditis was made.

On June 18 the child was more drowsy and toxæmic. Slight headache had developed, Kernig's sign was doubtful and neck stiffness was present. A blood count revealed that the leucocytes numbered 35,250 per cubic millimetre, 96% being polymorphonuclear cells, and lumbar puncture produced turbid cerebro-spinal fluid with uncountable cells and an organism which next day was identified as a pneumococcus and later proved to be type XVIII. The child became quite unconscious for forty-eight hours, with restless delirium controlled only by paraldehyde administered per rectum.

Sulphapyridine Treatment.

From June 18 to June 21 the child was treated with "M & B 693" given intravenously, at first one gramme every four hours; the dose was reduced on June 20 to 0.75 gramme every four hours. The temperature steadily fell to normal by June 22, and the cerebro-spinal fluid was rapidly clearing, the concentration of "M & B 693" in the fluid reaching 11.2 milligrammes per 100 cubic centimetres. On June 21 the drug was administered by mouth, 0.75 gramme every four hours. The child became very nauseated

and vomited, once only. On June 23 the temperature suddenly rose to 105° F. and an immediate lumbar puncture showed that the concentration of the drug had fallen to 1.6 milligrammes per 100 cubic centimetres. Intravenous administration was recommenced; but on June 24 albumin and blood appeared in several specimens of urine, and the child appeared very toxæmic and nauseated.

Sulphadiazine Treatment.

On June 25, by kind permission of the American Army, per medium of Major Macpherson Brown, sufficient sulphadiazine was made available, and with the much valued and helpful advice of Major Macpherson Brown and later of Colonel James Bordy, the child was treated by sulphadiazine, at first administered by mouth and later by subcutaneous drip therapy, until July 12. During this period 120 grammes of sulphadiazine were administered. The concentration in the blood varied from seven to eleven milligrammes per 100 cubic centimetres, and the concentration in the cerebro-spinal fluid varied from 3.2 to 6.3 milligrammes per 100 cubic centimetres. The daily temperature ranged from 102° to 105° F., the urinary output was always good, and on no occasion was albumin or blood found in the urine; but often many sulphadiazine crystals were present. The child's appetite was poor, and his tongue was heavily coated; but his mental state was always clear. Neck stiffness was constantly present and Kernig's sign was constantly elicited, and progressive wasting of the tissues was noted. Lumbar puncture constantly revealed opalescent fluid under pressure; the cell count ranged from 114 to 704 per cubic centimetre, and on all occasions all the leucocytes seen were polymorphonuclear cells. Culture on all occasions yielded a growth of pneumococci. Glucose was present, the protein content varied from 40 to 50 milligrammes per 100 cubic centimetres of fluid, the chloride content rose to 760 milligrammes per 100 cubic centimetres of fluid, and the leucocytes in the blood varied from 7,600 to 19,500 per cubic millimetre, the average polymorphonuclear cell percentage being 65. On July 9 sulphadiazine (dissolved in normal saline solution) was administered subcutaneously by continuous drip into the antero-lateral aspect of each thigh, but generalized oedema developed. The method proved rather painful, and absorption was insufficient to maintain concentration.

Sulphathiazole Treatment ("M & B 760").

From July 12 to July 15 sulphadiazine was replaced by sulphathiazole, with no clinical change in the picture. Transfusions of eight ounces of citrated blood were administered on June 24 and July 8. At this stage the child presented the picture of a chronic resistant meningitis, the organism having become resistant to the three sulphonamides, and the outlook appeared extremely grave.

Penicillin Treatment.

At midnight on July 15 1,000,000 units of penicillin arrived from the United States of America, and from July 16 to July 26 inclusive the boy received three cubic centimetres of penicillin (5,000 units per cubic centimetre) intramuscularly every four hours (90,000 units per day) and two cubic centimetres of penicillin diluted in eighteen cubic centimetres of normal saline solution (10,000 units) intrathecally, and on July 16, coincidentally with the first day's treatment with penicillin, he received a transfusion of eight ounces of his father's citrated blood. All other therapy ceased.

His temperature fell immediately from 105° to 96° F. in twenty-four hours, and until July 21 did not rise above 99.2° F. The child's general condition improved amazingly. His tongue cleared, his appetite became keen, he lost all toxæmic appearance and the cerebro-spinal fluid became sterile; the number of cells in the fluid fell to 110 per cubic centimetre, 75% being polymorphonuclear cells and 25% mononuclear cells.

From July 21 to July 26 the temperature began to rise steadily again to 104.6° F., and the cerebro-spinal fluid again yielded pneumococci on culture. The cell count rose to 210 per cubic centimetre.

Anti-Pneumococcal Serum and Sulphadiazine Treatment.

On the evening of July 23, 1,000,000 units of anti-pneumococcal rabbit serum, type XVIII, arrived from the United States of America. As it was evident that the organism had become resistant to penicillin, the patient was desensitized, and a daily dosage of 100,000 units of anti-pneumococcal serum was commenced by intramuscular injection and administered until August 1. The serum was first tested against the pneumococcus grown from the cerebro-spinal fluid, and capsular swelling took place. On July 26 the temperature had fallen to a maximum of

100.6° F., and at 8 a.m. on this day the administration of one and a half tablets of sulphadiazine (0.75 gramme) every four hours was recommenced, the drug taking the place of penicillin, the supply of which was exhausted. On July 28 the temperature fell to 97° F., and except for a transient rise to 99.4° F. on July 30 it remained either subnormal or normal. The amount of anti-pneumococcal serum was all used by August 1, but the administration of sulphadiazine at the rate of 0.5 gramme every four hours was continued to August 16 (a further 65 grammes of sulphadiazine being administered during this course of treatment without the slightest toxic results, and a constant cerebro-spinal fluid concentration of 5.9 to 6.3 milligrammes per 100 cubic centimetres of fluid being maintained). No further rise in temperature occurred, and the child made a steady recovery, returning home on September 18 apparently cured.

Comment.

Several interesting points are illustrated in this case.

1. Absorption of "M & B 693" failed when the drug was administered by mouth. The nausea produced appeared to be sufficient indication of this, for vomiting was negligible. The loss of concentration of the drug during the change-over from intravenous administration to administration by mouth gave the pneumococcus its chance to become resistant. This happening should be avoided at all costs in the treatment of pneumococcal and influenzal meningitis, and the symptom of nausea appears to be enough evidence to arouse suspicion of the possibility of failure of absorption.

2. The effect of sulphadiazine, both on the gastro-intestinal tract and on the kidneys, was comparatively less toxic. Although sulphadiazine therapy was commenced at a stage when the patient was extremely nauseated and the kidneys were extremely irritated, as evidenced by the presence of much albumin and blood in the urine and a diminished urinary output, all these symptoms cleared up within thirty-six hours of the commencement of the sulphadiazine treatment. At the same time, satisfactory concentrations of sulphadiazine could not be obtained by the enormous doses given by mouth. From June 30 to July 8 the patient received nine grammes per day, with a steady lowering of the blood concentration of the drug. The stools became pultaceous and clay-coloured during this period, and a test instituted by the pathological department of the hospital to estimate the sulphadiazine content of the faeces revealed an excretion rate of 15 milligrammes per 100 cubic centimetres of liquid faeces; this finding suggested also a state of failure of absorption of sulphadiazine. The organism during this period became completely resistant to sulphadiazine at the concentration prevailing in the cerebro-spinal fluid and blood.

3. Sulphadiazine administered subcutaneously to a child of this size proved unsatisfactory: (a) because it caused a good deal of pain and discomfort, (b) because absorption from the tissues was not rapid enough and not more than 50% of the desired dosage per day could be administered and absorbed, (c) because the normal saline solution in which it was administered appeared to cause rapid generalized oedema. This method of administration was resorted to only because all available superficial veins had at this stage been used for other intravenous therapy or for obtaining pathological and biochemical investigations.

4. The rapid improvement in the child's appetite, general condition and health, and his detoxication as soon as penicillin treatment was commenced, were striking features. This state of affairs was probably accelerated by the blood transfusion; but the early resistance of the organism to penicillin suggests that the initial dosages could have been greater or the mode of administration altered—perhaps greater doses could have been given intrathecally.

5. The child was finally rapidly cured by means of anti-pneumococcal serum, type XVIII, with the aid of smaller doses of sulphadiazine than those previously used.

6. At no stage was a definite focus detected from which the meningeal infection had originated or was kept activated. X-ray examination revealed a cloudiness of the left frontal sinus and left ethmoids, and the previous coryza and the oedema of the left upper eyelid present on the patient's admission to hospital, strongly suggest that the portal of entry was in this situation. Both mastoids were radiographically normal.

Acknowledgements.

In conclusion, so many people were directly and indirectly responsible for help and assistance in this case, both in the United States of America and in Australia, that it is impossible to enumerate even half of them; so it is best that with these few words we mention no one in particular, but express our sincere thanks to all.

PAROXYSMAL TACHYCARDIA IN AN INFANT.

By JAMES H. YOUNG, M.D., M.R.A.C.P.,
Perth.

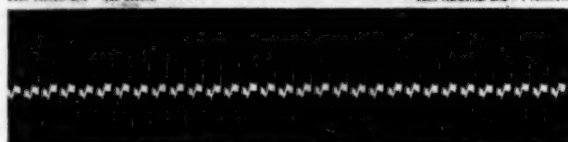
Clinical Record.

K.H., aged twenty-five days, was admitted to the Children's Hospital on December 30, 1943. The following history was given. The first child of the family had died of "heart disease" fifteen hours after birth. There was no post-mortem examination. The mother had had morbilli when five months pregnant. The second child was alive and well. The third child (the patient) was born on December 5. The mother had had a rash when three months pregnant. The nature of this rash is unknown. The confinement was normal. The baby was normal until the twentieth day, when it began to have attacks of cyanosis. The medical attendant had noted a heart rate of about 300 per minute. Under digitalis therapy this had dropped to 120 per minute, but the condition recurred.

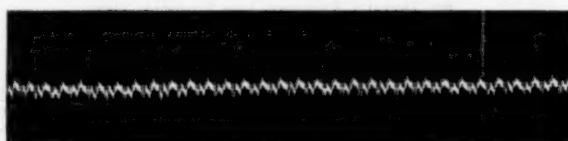
On admission to hospital, the infant was slightly cyanosed, and had a heart rate of about 300 per minute. The liver was enlarged. Electrocardiographic examination revealed supraventricular tachycardia with a rate of 310 per minute. Treatment with digitalis and "Moryl" failed to slow the rate, and the infant died next day from congestive cardiac failure.

Each Vertical Line = 1/25 Second

Each Horizontal Line = 1 Millimeter



Lead No. 1—Between Right and Left Arms



Lead No. 2—Between Right Arm and Left Leg



Lead No. 3—Between Left Arm and Left Leg



Lead No. 4—Pre-cordium and Left Leg

Post-Mortem Examination.

Post-mortem examination revealed an excess of serous fluid in the pericardium and pleural cavities, general enlargement of the heart, a *ductus arteriosus* which had not closed, congestion and oedema of the lungs, and congestion of the liver, spleen and kidneys.

Comment.

Cases of this nature have been reported before; but I am not aware of any in which the heart rate has been so fast.

The Medical Journal of Australia

SATURDAY, JUNE 10, 1944.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ON DEMOCRACY.

THOUGH he believe it not, every man has some kind of philosophy of life, some set of ideas that underlie the general course of his actions. His motives may be selfish, or more rarely, altruistic. In the former case he may strive for wealth, for power, for pleasure, for knowledge or merely for leisure time in which to indulge his laziness. Many men appear to live a humdrum existence, leading decent lives and varying their routine but little from day to day, but they, too, have a *motif* in life that is always ready to make itself felt. In what are known as democratic communities man is supposed to be free to choose his own sphere of activity and to order his life as he thinks fit, provided he does not infringe the rules, the laws, that society has laid down for its own protection. Though for economic and other reasons men are not always able to follow the calling of their choice, generally speaking they find an occupation for which they are fitted. But no man lives to himself. As a member of the community he takes part in its life, and his actions, good or bad, have an effect on the welfare of the whole body. That this effect may not, and probably will not, be evident matters not; it is none the less real. It therefore becomes the concern of every member in the community to give of his best in his everyday dealings with his fellow men, to seek their welfare as well as his own, and by intelligent cooperation to make the community a power for good in a world which, to say the least of it, stands in need of the stabilizing influence of many. This means that he must behave as a citizen worthy of recognition in a true democracy would behave.

A great deal of nonsense finds its way into serious discussions on democracy. Too often people use the term democracy to denote the kind of governmental set-up that appeals to them, that they would establish if they could. They often regard as undemocratic the set-up envisaged by someone else. Again there are people who would use democratic methods to gain a totalitarian end. Nine persons out of ten, if asked to define democratic govern-

ment, will most likely reply at once with the well-known words: "government of the people, by the people, for the people". It is probably as good a short definition as can be found, but it is often used without any understanding of the full implication of the words. The word democracy has been stretched to cover widely divergent types of government, some of them absurd, and we read that it has recently been stated that reference was made in the Press to the victory of the democratic cause at Waterloo. While it is probably true that democracy is not really capable of strict definition, many persons today will use the terms of the Atlantic Charter to state that democracy will confer on its citizens freedom from fear, freedom of worship, freedom of speech and freedom from want. This is quite acceptable if citizens understand that society is so constructed that the interdependence of its units is unavoidable—"whether one member suffer, all the members suffer with it". C. K. Allen has pointed out¹ that there is in the world today a body of ideas and practices which can conveniently be summed up in the term democracy and which in default of definition may be recognized by their irreconcilability with the totalitarian system. Allen enumerates the elements of a pragmatic democracy as follows: political equality, personal responsibility of the individual, representative government and free election, the majority principle, freedom of discussion, the rule of law, and the liberty of the individual. If these elements of democracy are considered one by one it will be seen that each of them implies that others have rights as well as self. Even if we think of freedom of discussion it will be obvious that one man cannot do all the talking (perhaps it would be better to write that one man should not do it all). And even when the one man is talking he ought in a decently conducted assemblage to refrain from using language that is offensive to others or likely to impute unworthy motives to his opponents. But this is by the way. We must return to the three obligations that have been stated for every member of the community—to give of the best, to consider the welfare of others and to cooperate for the good of the community. In regard to these three the mind naturally turns to liberty, equality and fraternity, the cry of the revolutionists in France. We know, and surely there will be no disagreement in the statement, that fraternity or brotherhood is the ideal for which democratic man should always aim. We ought to know also that liberty and equality are relative terms, that in fact neither of them can be achieved in human society in an absolute sense. Liberty or freedom of action, it has been stated, means in its most abstract sense the absence of external obstacles to the realization of desires. Liberty then will be increased as the power to attain it grows and restricted as wants are lessened. Bertrand Russell has pointed out that we cannot deal with freedom without taking account of the possibility of variable desires owing to a change of environment. As therefore we change a man's *milieu* we may be making it possible to increase his freedom, but, on the other hand, by our very action we may so place him that he will generate new desires and become discontented. If we go further and allow full play to freedom or liberty of action, there will most likely come a time when it will degenerate into licence. But when this stage is reached, and even before it, the individual

¹ C. K. Allen: "Democracy and the Individual", quoted in *The Times Literary Supplement*, January 22, 1944.

concerned will find that he has run foul of other members of society—his excess of liberty has curtailed the liberty of others, or at least has upset the even routine of their lives. Looked at from any point of view connected with democracy, the pursuit of liberty for self must be tempered with respect for that of others. What then shall we say of equality? Though we may hold that all men would be equal in an ideal community, the one that we might build if we could take society as is, "shatter it to bits and then remould it nearer to the heart's desire", we know that men are in fact not born equal either in bodily structure or in mental and spiritual equipment. In his essay on the inequality of man, J. B. S. Haldane points out that human inequality springs from two sources, nature and nurture. He discusses the subject in relation to the democratic way of life and tries to show that the recognition of innate inequality would lead, not to less, but to greater, equality of opportunity. This is an enormous subject that calls for a special discussion. It may be suggested, however, that an answer to the problem of equality in democracy may possibly be found in what Jacques Maritain calls proportional equality,¹ an equality "that takes into account the relations between the social whole and its parts". "It is a new kind of equality which by virtue of justice, friendship and human compassion and by virtue of the communication they provoke is realized in the fruit."

From this short reference to liberty and equality we may conclude that one who is prepared to consider them from what may be called their relative points of view, will be the better equipped to approach the subject of fraternity, that state of harmony which should exist in the ideal democratic state. To a man so equipped the elements of democracy will assume, if not a new, at least a more real, significance. These elements may not be exactly those enumerated by Allen, but they will be much the same. What will become evident to the deliberate searcher for truth will be that democracy is not something to be accepted and passively enjoyed, but rather something that must be actively pursued and continually created. This means that of all its elements the personal responsibility of the individual is all-pervading. To deny this responsibility is to weaken the framework of democracy and incidentally to qualify for exclusion from its privileges. In Australia at the present time, and no doubt in other so-called democratic countries as well, the most prominent and most regrettable feature of community life, and one which threatens its whole stability, is the neglect or the actual denial by the individual of personal responsibility in the national welfare. This kind of thing is seen on every hand. There is no need to be explicit or to point the finger in any one direction. Readers can do this for themselves, but when they do they should ask themselves whether others engaged in finger pointing would be justified in pointing in their direction. The fact is that materialism is rampant. People think more of the welfare of the moment and of what it can bring than of the future of society in relation to humanity at large. We hear of refusal to "work for the Government" because by working for more than a certain time taxation will become heavier and the amount available for spending will not be equal to the extra time spent at work. And this sort of talk is not confined to manual workers as some might

suppose. Every man who tries to evade his legitimate obligation in the matter of taxation is stabbing society in the back, and with the nation at war he must be branded as playing into the hands of the enemy.

To state a remedy for present shortcomings is easier than to apply it. Some people would turn out one government and put in another of their own creation; others would use compulsion on recalcitrant people. It is possible to conceive of circumstances in which either or both of these expedients might with advantage be adopted. What is needed, however, is something much more deeply seated. What is needed, as a recent writer has suggested, is that each man and woman in the community shall discover what the "good life" for himself or herself is and endeavour to live it. This does not mean that many at present are not living such lives. Many are; and they are the stabilizers of society. Those who merit this term must by the force of their example encourage other persons to inquire and so to equip themselves that they may discover their type of "good life". Compulsion or even over-persuasion are not advisable, for conviction is necessary and can be imposed by no one. It does not follow that each person living his "good life" will think along the same lines as others who are living their "good lives". Different methods of approach in the matter of democratic living will possibly produce widely divergent conclusions. These differences should be welcomed and even sought; when they are looked at dispassionately and examined in detachment, horizons will be widened and new truths may be discovered. It has been said that we must be willing to undergo such a revolution of the mind that our thought will become "fully permissive" and not merely tolerant. This task of helping people to think for themselves is one of the ways in which personal responsibility may be exercised. Perhaps the task may be summed up in the word education, but this means education in the proper sense; it does not mean the use of propaganda. Education equips a man to make a choice for himself; it does not impose a choice on him. It will possibly be objected that such statements as these merely express idealism which cannot be put into practice. Idealism it may be; but if Australia or any other country is to flourish as a true democracy comprising men of goodwill living in harmony with one another and with other nations, idealism must find a place. To overcome human prejudice is the most difficult thing that man can try to do. Its very difficulty should be a stimulus to effort. What we must keep always before us is that our democracy must be just. If it is not just, it will perish.

Current Comment.

ANTIBIOTICS.

THE history of the protection of the body against bacterial invasion will one day no doubt supply one of the most interesting chapters to the long story of modern medical science. We are today only half through that chapter, if as much. At first through the stimulus of Lister aromatic carbon compounds or salts of heavy metals were chosen on account of their marked bactericidal action *in vitro*. Many hopes arising from this application of antiseptics were doomed to disappointment; there are many physicians alive today who can remember when

¹ Jacques Maritain: "Redeeming the Time", reviewed in *The Times Literary Supplement*, November 13, 1943.

attempts were made to cure tuberculosis in the lungs by inhalation of medical vapours or to sterilize the intestines by drugs taken orally. It soon became apparent that, such is the similarity of all living tissue, plant and animal, an agent which can injure the parasite by chemical action will also injure the host. With most drugs there is but a narrow margin between the therapeutic and the lethal, and in that margin the physician has to work warily. Then there was the striking but unexplained phenomenon that many chemical substances like quinine can be effective in the human body in concentrations utterly without effect in the test tube. A new era opened with the discovery of the defence mechanisms of the body itself, and here what was sadly wanting in therapeutical preparations, namely, specificity, was found to be present to a truly remarkable extent. The latest discovery is that of antibiotics, that is, of substances produced by living things and extruded into their environment with the faculty of inhibiting the growth of competitors or enemies. After all the detection of penicillin should not have evoked the surprise it did, for when a mould or indeed any organism is found to be flourishing in what is to all intents and purposes a pure culture without human interference or the accident of uncontaminated insemination, the only possible explanation is that the organism in Nazi fashion has exterminated its rivals. We may learn more from the botanist on this count. The existence of vast grass lands has been ascribed to geological and climatological factors, but it may be that the grass has a ruthless antibiotic excretion; who knows but extensive forests of one species or variety of tree may be similarly explained. The limitations of penicillin in human surgery are to be sought in its value to the parent mould in its natural habitat. It is bacteriostatic towards *Streptococcus pyogenes*, *Staphylococcus aureus* and the causative organisms of pneumonia, gonorrhoea, diphtheria, spotted fever and gas gangrene, but has no action on cholera, dysentery, tuberculosis or plague.¹ All this will doubtless be cleared up as by a few strokes of the pen when the nature of penicillium's special rivals has been disclosed.

A very interesting investigation is that concerned with the bactericidal or bacteriostatic agents produced by fly larvæ. When these fly larvæ were first introduced into surgery it was thought that their service consisted in eating up necrosed and autolysed tissue which could easily afford pabulum for invading bacteria, but recent research has shown that the fly larvæ develop in their alimentary canals and exude upon the wound surface a powerful bactericidal agent.² This principle is found in greatest amounts or at least with greatest potency in the early stages of larval development, and in consequence it has been suggested that fly eggs instead of larvæ should be applied to the types of wound which react favourably to this treatment. It has also been noted that the antibacterial action is depressed by cold. We are only at the beginning of a very interesting and probably most important phase of medical research dealing with the protection of our bodies against the aggression of lower forms of life.

AN EXERCISE TOLERANCE TEST.

In assessing damage to cardiac function, the clinician usually finds that he has to depend largely on the patient's symptoms. But in some cases it is inadvisable to rely greatly on what the patient has to say. Then the clinical examination must include some sort of exercise tolerance test. The interpretation of the results of exercise tolerance tests is not always easy. A person might be distressed by a test that consists of exertion that he is unaccustomed to; but he might be able to perform with comparative ease such exercises as he performs in his daily life. All medical men of experience have had occasion to marvel at the

ability of men to continue at manual work despite the evidence of cardiac failure. Generally the methods of applying exercise tolerance tests have been too vague. The results obtained by one observer may be quite different from those obtained by another. A. M. Master and co-workers have paid considerable attention to these tests, and Master has devised a table setting out what he regards as suitable standard exercises according to age, weight and sex. Master terms his test the "two-step" test. The patient steps up and down two steps, each nine inches in height. A man aged forty years and weighing 150 pounds would have to ascend and descend the steps 22 times; a woman aged twenty years and weighing 89 pounds would ascend and descend 28 times, and so on. In general the necessary amount of exertion diminishes as age and weight increase. The exercise is completed in one and a half minutes. Primarily the tolerance was assessed by measuring the pulse rate and blood pressure and noting their rate of return to normal. Recently the test has been extended in its scope to include electrocardiographic examination before and after exertion. A. M. Master, S. Nuzle, R. C. Brown and R. C. Parker have recorded the results of their investigations into its application to the assessment of coronary arterial efficiency.³ They point out that in many cases of coronary arterial degeneration as manifested by *angina pectoris*, clinical, radiological and electrocardiographic examination reveals no abnormality; but response to exercise may be poor, and electrocardiographic examination after exercise reveals characteristic changes. In applying the test, they first of all take an electrocardiographic tracing and blood pressure reading, and make a note of the pulse rate. The patient then carries out the prescribed exercise with the sphygmomanometer cuff and the electrocardiograph electrodes attached. Further readings are then rapidly made. In coronary insufficiency it is found that such changes as depression of the S-T interval, a change in direction of the T wave, flattening of the T wave, widening of the QRS complex, increase in depth of the Q wave, and prolongation of the P-R interval, may occur. These changes do not occur in the electrocardiogram of the normal person.

Master and his co-workers believe that the abnormal appearances are due to anoxemia of the heart muscle. To test this view they took electrocardiographic tracings from patients who were breathing an atmosphere containing only 10% of oxygen. A closely fitting mask was applied and the patient was allowed to become accustomed to it by breathing ordinary air through it for a few minutes before it was connected up to the apparatus supplying the air containing 10% of oxygen. Electrocardiographic tracings were taken every five minutes over a total period of twenty minutes unless the patient showed such signs of intolerance as "circulatory collapse, sudden significant fall of blood pressure, syncope, etc.". In every apparently normal case but one the tracings obtained after respiration of an atmosphere deficient in oxygen were the same as those obtained after exercise. The exceptional case was that of a man, aged sixty years, who collapsed and became affected with nodal rhythm after breathing the 10% oxygen mixture for only six minutes. In the abnormal cases the respiration of atmosphere deficient in oxygen occasionally failed to cause electrocardiographic changes.

The tests were also applied to patients with valvular disease, Da Costa's syndrome, hypertension and congenital cardiac disease. Electrocardiographic changes were noted after exercise in many cases. Abnormal appearances in Da Costa's syndrome are of particular interest. "These people tire on effort because they have a diminished cardiac output and the oxygen saturation of the blood is low and because they develop anoxemia of the heart muscle." This statement will scarcely meet with the approval of those (and they are many) who regard Da Costa's syndrome as a pure neurosis.

Master deserves our gratitude for devising a standard of exercise for the exercise tolerance test. He and his fellows have done a service in drawing attention to the electrocardiographic findings after exercise and in oxygen lack. Their test is simple and is worth using in doubtful cases.

¹ *Nature*, January 8, 1944, page 40; *THE MEDICAL JOURNAL OF AUSTRALIA*, May 13, 1944, page 444; Ruy Vieira da Rocha, "Contribuição ao estudo da penicilina" (Doctorate Thesis), Porto Alegre, Brazil, December, 1943.

² D. N. Talliev: "Bactericidal Properties of Fly Larvæ", *Comptes Rendus (Doklady), de l'Académie des Sciences de l'URSS, Nouvelle Série*, Volume XXXIX, 1943, page 155.

³ *The American Journal of the Medical Sciences*, April, 1944.

Abstracts from Medical Literature.

SURGERY.

A Cardioscope for Intracardiac Surgery.

D. E. HARKEN and EVELYN M. GLIDDEN (*The Journal of Thoracic Surgery*, August, 1943) describe two cardioscopes—one designed by themselves and another designed by R. Keith and F. Wappler, for exploration of the interior of the heart and for such operations as valvulotomy. Their own instrument consists of a glass cannula which carries the light-bearing thoracoscope and over the end of which is fitted a tough, elastic and perfectly transparent balloon. These balloons have been made "from various plastics". The cardioscope can be inserted readily through the auricle of the atrium, after which the balloon is distended with saline solution introduced through a side arm of the cannula.

Anterior Resection of the Recto-Sigmoid and Upper Portion of the Rectum with Reestablishment of Continuity.

L. S. FALLIS (*Surgery*, September, 1943) claims that there are certain indications for the treatment of a carcinoma of the recto-sigmoid and upper portion of the rectum by a conservative resection, with reestablishment of continuity. After briefly reviewing the reasons for the acceptance of the abdomino-perineal operation as the standard procedure, the author puts forward the opinion that this operation, at any rate in certain cases, may be unnecessarily radical. In support of this contention he refers to recent work by Collier and others which indicates that, in the great majority of cases, the glandular spread is upwards. The author emphasizes the need for careful decision regarding the appropriate operation in each case, but thinks that conservative resection is indicated in the following instances: tumours of the low sigmoid, as a matter of expediency in certain poor risk patients, as a substitute for the classical abdomino-perineal operation in cases of borderline operability, and also when colostomy is refused. The author describes the technique he follows in anterior resection of the rectum.

The September number of *Surgery* comprises a symposium on the surgical management of carcinoma of the colon.

Ligature of Coronary Arteries.

E. DE JESUS ZERRINI (*The Journal of Thoracic Surgery*, October, 1943) ligated the anterior descending branches of the left coronary artery and vein of a six-year boy whose heart had been wounded by an iron splinter. The boy was able to leave hospital, apparently well, and showing no signs of myocardial infarction or diminution of cardiac reserve, two months after the operation. He was still quite well a year later. An electrocardiogram made fourteen days after the operation showed a little flattening of the T waves; another made sixty days after the operation showed inversion of T in leads II, III and IV; another made 118 days after the operation showed

inversion of T in leads III and IV, and another made 238 days after the operation showed flattening of T in lead III and inversion of T in lead IV; the tracings were otherwise normal. The author deduces from the literature of the subject that after ligation of a coronary artery there may be myocardial infarction with electrocardiographic evidence of its existence, electrocardiographic evidence of myocardial infarction without clinical evidence, or neither clinical nor electrocardiographic evidence of infarction, as in the case reported. On the other hand, there may be electrocardiographic evidence of myocardial infarction after suture of a myocardial wound in the absence of injury to a coronary vessel.

Treatment of Traumatic Shock Complicated by Frostbite and Burns.

L. S. STERN, J. A. ROSSIN, M. M. GROMAKOVSKAIA and L. E. CAFLAN (*Bulletin of Experimental Biology and Medicine*, Moscow, Number 6, 1943) develop their previous experimental work on traumatic shock. To an extensive injury of the hip and fracture of femur in dogs they add refrigeration of the limbs or burns. In their previous extensive experiments on animals they have established that the main factor causing the dramatic syndrome of shock is the derangement of the neuro-vegetative system. The decrease of the tonus of the sympathetic nervous system is a result of the decrease of the potassium/calcium coefficient in the cerebro-spinal fluid. In other words the fall of the concentration of potassium ions and/or the rise of calcium ions is the principal cause of the rapid fall of the tonus of the sympathetic system. The injection of potassium phosphate directly in the spinal canal in cases of shock causes a rapid improvement of the condition of the shocked animal, even when the usual methods of resuscitation fail to influence the condition. These experimental data have been largely verified in the Red Army field hospitals. After an intraspinal injection of potassium phosphate the breathing becomes more rhythmical and deep, the blood pressure rises and consciousness returns in a few minutes. When the simple traumatic shock is complicated by frostbite or burns and the necrotized tissues are not removed in a short time, there arises a secondary or toxic shock due to the absorption of the toxins. Treatment of traumatic shock complicated by frostbite or burns should be resuscitation by routine methods, injection of potassium phosphate in the spinal canal and immediate excision of the affected tissues. At the same time stimulation of diuresis will help to free the system from toxic substances already absorbed in the blood stream.

Symptoms after Cholecystectomy.

DEAN MACDONALD (*The American Journal of Surgery*, October, 1943) discusses symptoms which may follow cholecystectomy, and presents a general discussion of the principal factors involved. The author claims that from one in three to one in six patients subjected to cholecystectomy are not cured. The proportion of unfavourable results is higher in non-calculous disease of the gall-bladder, because the principal symptom-producing

mechanisms—hepatitis, cholangitis, common duct disease, pylorospasm, sphincterospasm *et cetera*—are only indirectly attacked and are not removed. The causes of minor post-operative complaints include sphincterospasm, pylorospasm, liver or gut trauma, and blood, mucus or debris in the ductal system. Major complaints are principally due to the following causes: wrong diagnosis, residual disease, calculi in the common duct, partial obstruction of duodenum or common bile duct due to adhesions, stricture of the common duct, functional disturbances, lack of medical treatment when indicated, traumatic neuroma in the wound, and malignant disease. Wrong diagnosis is considered to be the most common cause of unsuccessful treatment. The importance of the history is stressed in this connexion; the X-ray investigation is confirmatory rather than diagnostic. Problems are usually due to common diseases presenting unusual symptoms, and only occasionally to rare diseases. The more definite the diagnosis, the better the results of treatment. In the absence of definite indications for surgery, medical treatment is indicated. The author proceeds to a consideration of the other causes listed above, and describes the advantages of cholangiography where this can be carried out through a drainage tube in the common duct. The differential diagnosis of stone or stricture of the common bile duct as the cause of symptoms is not so important as the realization that serious ductal disease is present, and that early and expert surgical treatment is the only method of preventing advanced liver disease and finally liver failure. The author considers in some detail the other factors causing post-operative symptoms. The paper is illustrated with a number of cholangiograms.

Effect of Sulphanilamide Powder on the Healing of Sterile and Infected Wounds.

C. M. JONES, M. K. BARTLETT, A. E. RYAN and G. D. DRUMMERY (*The New England Journal of Medicine*, October 21, 1943) discuss the results of an experimental study of the effect of sulphanilamide on the healing of sterile and infected wounds in animals, with special reference to the tensile strength and the ascorbic acid content of the scar. It was found that the use of sulphanilamide powder under varying experimental conditions in no way retarded healing or resulted in inefficient scar formation. Nor was there any evidence that sulphanilamide caused a deviation of ascorbic acid away from scar tissue, or increased the need of ascorbic acid in the production of a normal strong cicatrix. Certain of the results suggested that maximal saturation of tissues with ascorbic acid aids in providing optimal tissue resistance to infection.

"Zephiran."

H. B. SCHUMACKER, JUNIOR, and W. R. BETHEA, JUNIOR (*Surgery*, December, 1943), describe the properties of "Zephiran", and report the results of studies to extend the sphere of its usefulness, especially in war surgery. "Zephiran" is an amber solid of soap-like consistency, which is marketed as a one in ten concentrate. Chemically it is a mixture of high molecular alkyl-

dimethyl-benzyl ammonium chlorides in which the alkyl group represents a series of homologous radicals derived from the fatty acids of coconut oil. "Zephiran" has a definite detergent, keratolytic and emollient action, and a low surface tension. Soap exerts an inactivating action upon "Zephiran", but local anaesthetics and the sulphonamides are compatible with it. Studies indicate that a brief scrubbing of the hands and forearms in a one in 1,000 aqueous solution of "Zephiran", followed by a three-minute soak in this solution, achieves as thorough cleansing as prolonged scrubbing with soap and water. In one in 2,500 or one in 1,000 aqueous solution it serves ideally for pre-operative preparation of the skin. For a wide variety of uses it has advantages over many of the more commonly employed germicidal agents. Finally its compactness for transportation makes it especially useful for war purposes.

Influence of Vitamin K on Thrombosis.

C. B. MORTON, E. W. SHEARSBURN AND R. E. BURGER (*Surgery*, December, 1943) present the results of a study of a group of patients and of a series of animal experiments, the investigations being made to determine what influence, if any, the use of vitamin K might have on thrombus formation. In the clinical study it was found in 700 pregnant women to whom either synthetic or natural vitamin K had to be given, that the post-partum incidence of thrombosis was only 0.14%, which was less than the incidence during the preceding ten years, when 5,728 deliveries had been accompanied by an incidence of 0.48%. In the animal experiments the leg veins of two groups of dogs were mechanically traumatized. Sections of these veins were removed after 48 to 96 hours and examined microscopically. There was a slightly greater incidence (38% against 33%) of thrombosis in the group which had been fed with vitamin K, but the authors do not regard it as significant. They conclude that excess of vitamin K does not result in an increased rate of thrombophlebitis.

Oesophageal Diverticulum.

D. E. ROSS (*The American Journal of Surgery*, January, 1944) provides a short note on the history of the operative treatment of oesophageal diverticula, and discusses the pathology and treatment. The first successful removal was performed by Wheeler in 1886. The commonest site of occurrence is at the upper end of the oesophagus, where the lesion is really a pharyngo-oesophageal diverticulum. It makes its exit posteriorly and almost always extends to the left side and downwards along the oesophagus. It consists of mucosa with a surrounding layer of areolar tissue. There is usually some slight deviation of the oesophagus at the site of the diverticulum, so that the food tends to drop more easily into the diverticulum than down the oesophagus. Typical symptoms are dysphagia, regurgitation of food, an irritable cough, and sometimes hoarseness. There may be secondary loss of weight. The diagnosis is usually made easily by a barium "swallow". Operation may be performed in one stage, but as the sac is opened, this involves danger of spread of infection in the

neck, which may extend to the mediastinum, as there is no barrier to the spread of infection in this direction. The two-stage operation is designed to obviate this danger, as the sac is here freed and packed round with gauze to promote adhesions. At the second operation the sac is excised in an area which is shut off from the general tissue planes of the neck. The author suggests that a more satisfactory procedure is a one-stage operation in which the sac is freed, and then, without being opened, invaginated into the pharynx. He points out that this is not an original or new operation. Girard, who wrote of the condition in 1896, used it extensively in France, but it is an operation which has not become popular. The sac is exposed in the usual way, and dissected carefully down to the neck so that the muscle tissue in the edges of the pharyngo-oesophageal opening are well defined. The sac is then simply invaginated into the pharynx. The author states that when the sac is dissected free, its size is always much reduced. The muscle layer is closed with silk sutures, and a layer of fascia is used as a reinforcement. The patient has no sensation of a foreign body in the pharynx, and it causes no trouble. When examined with a laryngoscope, the invaginated sac appears as a redundant fold of mucosa which soon shrinks, and in a few weeks has a normal appearance. A Rehmann tube is left in the stomach for thirty-six hours, and in forty-eight hours the patient is allowed to drink fluids. No recurrences have been seen in the author's cases.

Ossification in Abdominal Scars.

H. J. MCCURRICH AND E. MILLINGTON (*The British Journal of Surgery*, July, 1943) provide notes of a case and a short discussion of the occurrence of bone in abdominal scars. The condition is rare, and must be distinguished from the occurrence of mere calcification in scars. With rare exceptions, the condition is seen only in wounds of the anterior abdominal wall, in or near the mid-line, and between the umbilicus and the xiphisternum. It has been noted that in certain reptilia, bony rib-like structures are found in this region. But in the human subject, ribs and sternum are formed in cartilage, and it appears that the ectopic bone of scars is a membrane bone, no cartilage ever having been described in this situation. It is generally believed that the ossification is due to the conversion of fibroblasts to osteoblasts, and that trauma and infection may play a part; but no satisfactory explanation has been given of the fact that this bone formation is confined to the area indicated.

Lymphosarcoma of the Gastro-Intestinal Tract.

B. MCSWAIN AND J. M. BEAL (*Annals of Surgery*, January, 1944) give details of twenty cases of gastro-intestinal lymphosarcoma which have been observed at the New York Hospital over the last nine years. The incidence of this lesion during the period examined was one case of lymphosarcoma to every fifty-one cases of carcinoma of the alimentary canal. The condition was found in the oesophagus, stomach, small intestine, appendix and large intestine, the most common being the stomach and large bowel, in each

of which the lesion was found seven times. Generally speaking, the symptoms did not enable the lesion to be diagnosed from carcinoma. X-ray examination also is not as a rule diagnostic, though the diagnosis was made by this means in three cases of the present series. Two points are, however, suggestive. One is the large size of the lesion in relation to the short duration of symptoms, and the other is the presence of whorl-like defects in the barium outline. Blood counts were throughout of no aid in diagnosis. The authors consider that resection of the growth should be performed in every case in which this is technically possible. Röntgenotherapy should follow unless the operator and the pathologist are certain that the lesion has been completely eradicated. Irradiation should be started as soon as the wound is healed and the patient ambulatory. When resection is not possible, Röntgenotherapy should be used. In some cases, this form of treatment may have to be discontinued owing to inability of the patient to tolerate it. When irradiation can be used, the local lesion responds well, and palpable masses often melt away dramatically. Of the twenty patients, six, in whom the treatment was confined to surgical extirpation, are alive and well from two to seven years after. Of six patients treated by irradiation alone, only two are without evidence of recurrence. Two other patients treated by resection followed by irradiation are also without evidence of recurrence.

Post-Operative Pain in Thoracic Surgery.

J. JOHNSON (*The Journal of Thoracic Surgery*, December, 1943), in the course of a discussion of the complications of pneumonectomy, an operation in which a long intercostal incision is used, states that a programme of treatment to meet these complications may be made impracticable by post-operative pain, which is often severe. He has tried morphine for this pain, but has found it difficult to provide enough sedation with it to relieve the pain adequately and yet not to depress the cough reflex and respiratory rate to a dangerous degree. He advocates prevention of the pain by crushing at the time of the operation the intercostal nerves, from the second nerve to the seventh, if the incision is in the fourth or fifth intercostal space.

Thoracoscopic Removal of a Needle from the Chest.

R. A. S. CORY (*The Journal of Thoracic Surgery*, December, 1943), removing with the thoracoscope a portion of a needle which had broken in the chest wall and fallen into the pleural cavity, first grasped the needle by the middle with the forceps and stuck the point into the parietal pleura. It was then a simple matter to grasp it by its protruding end and draw it out through the cannula in line with the forceps.

Pneumonectomy for Metastatic Carcinoma.

P. S. BRENEZINA AND G. E. LINDEKOG (*The Journal of Thoracic Surgery*, December, 1943) report a successful pneumonectomy for a solitary metastasis in the lung from an adenocarcinoma of the uterus.

British Medical Association News.

ANNUAL MEETING.

THE annual meeting of the Tasmanian Branch of the British Medical Association was held at the Royal Society's rooms, Hobart, on February 26, 1944, Dr. A. PRYDE, the President, in the chair.

Annual Report of the Council.

The annual report of the Council for the previous twelve months was read and adopted. The report is as follows.

The membership of the Branch, which was 98 on December 31, 1942, was 106 at the end of 1943. Ten new members were elected during the year, three members were transferred from other branches, twelve resumed membership through payment of an overdue subscription, while fifteen allowed their membership to lapse, one was transferred to another branch and two have died. Of the fifteen members who lapsed on December 31, 1943, eight have resumed their membership since. The others may resume without reelection if they pay their subscription before March 31.

Eight ordinary meetings of the Branch and one special clinical meeting have been held since the last annual meeting. The average attendance at the ordinary meetings was 17.8, compared with 14.4 the previous year. The attendance at the special clinical meeting was over forty.

Papers have been read by Lieutenant-Colonel B. M. Carruthers, Major J. B. Hamilton and Major T. Giblin, and Dr. Mapleton, Dr. Fay, Dr. Phillips, Dr. T. Butler and Dr. Kelly, while cases have been demonstrated by Dr. Muir, Dr. T. Butler, Dr. W. Freeman and Dr. Duncan.

At the special clinical meeting, which was organized by Dr. Muir and the staff of the Royal Hobart Hospital, papers were read and cases demonstrated by Dr. Muir, Dr. T. Butler, Dr. Goddard, Dr. Whishaw, Dr. Duncan and Dr. W. Freeman.

The Branch is grateful to the Tasmanian Branches of the Royal Australasian College of Surgeons and the Ophthalmological Society of Australia for inviting members of the association to attend their annual clinical meetings.

Nine meetings of the Branch Council have been held, attendances being as follows: Dr. Pryde 2, Dr. Hillier 7, Dr. Fay 8, Dr. Reid 8, Dr. Craig 5, Dr. Crowther 8, Dr. Whishaw 6, Dr. Brothers 5, Dr. Millar 6, Dr. Birchall 1, Dr. Walch 9.

Committees have been appointed by the Branch Council to deal with ethical matters, medical planning, provisions

for more frequent autopsies, rationing of linen and petrol, and investigation in Tasmania of the effects of rubella on the fetus.

The Branch has been represented on the Federal Council by Dr. J. S. Reid and Dr. C. Craig, and desires to record appreciation of their work.

The greater part of the work of the Branch Council during the year has been consideration of matters to be dealt with by the Federal Council and expression of views concerning these matters for the guidance of that Council. This business has covered a wide range of subjects, and is increasing in quantity. Among the major items are the proposed national medical service, the organization of the profession in Australia, and the provision of increased powers and a permanent secretariat for the Federal Council to enable it to carry on negotiations on behalf of the Branches.

These increased Federal activities naturally involve increased expenditure by the Federal Council, which makes necessary an increase in the *per capita* payment from the Branches. It is partly for this reason and also to provide for the gradual growth in the costs of our own organization that the Branch Council has recommended that the annual subscription for ordinary members of the Branch be increased from £4 4s. to £5 5s.

The Branch Council was recently able to congratulate two of our members, Dr. G. H. Hogg and Sir John Ramsay, on having attained fifty years' membership of the association. It is with great regret that we have to record the loss which our Branch has incurred by the death of Sir John Ramsay.

Financial Statement.

The Honorary Treasurer presented the balance sheet and financial statement for the year. The statements, which are published herewith, were adopted.

The Northern Division.

The annual report of the Northern Division was read and received.

Election of Office-Bearers.

The following office-bearers were elected for the ensuing twelve months.

President-Elect: Dr. G. M. W. Clemons.

Vice-President: Dr. W. E. L. H. Crowther.

Members of the Council: Dr. C. R. D. Brothers, Dr. F. W. Fay, Dr. T. Butler.

Honorary Treasurer: Dr. J. P. Millar.

Honorary Secretary: Dr. J. H. B. Walch.

Auditors: Messrs. Adams and Bennetto.

THE BRITISH MEDICAL ASSOCIATION (TASMANIAN BRANCH).

Statement of Receipts and Payments for the Year Ended December 31, 1943.

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Balance brought forward	397	16 3	By Southern Division, British Medical Association	24	10 0
" Members' Subscriptions	418	13 3	" Northern Division, British Medical Association	21	10 0
" Interest on Commonwealth Inscribed Stock ..	19	17 0	" British Medical Association, London .. .	129	0 6
" Interest on Debenture, Australasian Medical Publishing Company, Limited .. .	5	2 1	" Australasian Medical Publishing Company, Limited .. .	96	10 0
" Interest on Fixed Deposit at Hobart Savings Bank .. .	4	10 2	" J. B. Walch, Honorarium .. .	30	0 0
			" Royal Society of Tasmania (Rent of Rooms)	15	0 0
			" Adams and Bennetto—Audit Fee .. .	2	2 0
			" Assistants' Fee, Postages <i>et cetera</i> .. .	44	15 4
			" J. Walch and Sons—Stationery .. .	8	19 6
			" Branch Council—British Medical Association	11	0 0
			" Bank Charges .. .	1	8 8
			" Balance carried forward .. .	475	8 5
	£845	19 3		£845	19 3

Statement of Assets.

	£	s. d.
Cash at Bank (including £14 5s. 11d. Commonwealth Loan Interest of National Emergency Fund) .. .	489	14 4
Deposit, Hobart Savings Bank .. .	150	0 0
Commonwealth Inscribed Stock .. .	600	0 0
Australasian Medical Publishing Company, Limited—Debentures .. .	95	0 0
War Savings Certificates .. .	133	0 0
Furniture at Library .. .	20	0 0
	£1,487	14 4

Audited and found correct.

ADAMS AND BENNETTO,
Chartered Accountants (Aust.), Auditors.

Induction of President.

Dr. A. Pryde vacated the chair in favour of Dr. B. Hillier, who thanked members for his election.

Branch Subscription.

It was moved as a recommendation from the Branch Council and carried unanimously that Rule 6 of the Rules of the Branch be amended to make the annual subscription for ordinary members of the Branch five guineas instead of four guineas as heretofore.

Retiring President's Address.

Dr. A. Pryde, the retiring President, read his address entitled "Some Aspects of Goltre in Northern Tasmania" (see page 525).

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on April 20, 1944, at the Royal Alexandra Hospital for Children. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Cirrhosis of the Liver.

DR. L. A. DEY showed a female child, who had first been admitted to hospital on August 7, 1937, at the age of seven months. At that time she was suffering from intussusception, and at operation the left kidney was found to be very large. A retrograde pyelographic examination made on September 14, 1937, suggested the presence of a polycystic kidney on the left side. Both kidneys were then palpable and hard. On October 23, 1943, when the child was aged six and a half years, she was readmitted to hospital. She had had a massive hæmatemesis the previous night, the vomitus containing old and recent blood. No pain was present.

On examination, the liver was found to be irregularly enlarged and extended over to the left, three inches below the costal margin. A mass was palpable in each flank in the kidney pouch; the mass on the left side was larger than that on the right. A blood count gave the following information: the erythrocytes numbered 1,800,000 per cubic millimetre, the hæmoglobin value was 6.1 grammes per 100 cubic centimetres, and the platelets numbered 216,000 per cubic millimetre; the leucocytes numbered 8,700 per cubic millimetre. On October 24 a blood transfusion was given. On October 25 the child had a further hæmatemesis and was very pale. On October 27 a drip transfusion of blood was given. On November 1 the erythrocytes numbered 2,800,000 per cubic millimetre and the hæmoglobin value was 8.3 grammes per cubic centimetre. By December 1, when the child had been at home for some weeks, the erythrocytes numbered 3,000,000 per cubic millimetre and the hæmoglobin value was 10.6 grammes per 100 cubic centimetres. On March 28, 1944, the spleen was enlarged. The erythrocytes numbered 4,190,000 per cubic millimetre, the hæmoglobin value was 10.2 grammes per 100 cubic centimetres, and the platelets numbered 377,100 per cubic millimetre.

Scurvy.

DR. R. J. TAYLOR showed a female child, aged eleven months, suffering from scurvy. The mother said that the child had been well until one week prior to the meeting, when she became fretful and listless and appeared to feel pain on being lifted. The stools were offensive and green in colour. The child had been fed on modified milk, and the mother had not been able to obtain oranges for some time.

On examination, the child's gums appeared normal, and no definite tenderness of the limbs was found. X-ray examination of the long bones revealed scurvy. The child was pyrexial on her admission to hospital, and eight days later a subperiosteal hæmorrhage occurred above the right ankle. Dr. Taylor said that she had been treated by the administration of 100 milligrammes of ascorbic acid per day, orange juice and "Adexol".

Icterus Gravis Neonatorum.

DR. KATHLEEN WINNING showed four children suffering from *icterus gravis neonatorum*. The first was a girl, who had been born on April 8, 1944, and admitted to hospital on April 11. The parents had one other child, who was alive and well. The baby shown had been noticed to be jaundiced soon after birth. On examination of the child, the spleen was not palpable, but the baby was orange-yellow in colour. A blood count on April 12 revealed that the erythrocytes numbered 3,760,000 per cubic millimetre and the hæmoglobin value was 16.0 grammes per 100 cubic centimetres. A transfusion of Rh-negative blood was given. On April 17 the erythrocytes numbered 3,390,000 per cubic millimetre and the hæmoglobin value was 11.1 grammes per 100 cubic centimetres.

Dr. Winning's second patient was a male baby, who had been born on August 7, 1943, and admitted to hospital on August 12. The child was the second in the family; the first child had not been jaundiced, and was alive and well. The baby shown was jaundiced at birth, and the jaundice deepened each day; he was not lethargic, and was breast fed. On examination, the baby was seen to be of a deep bronze colour with a greenish tinge. The liver was palpable, but the spleen was not. On August 12 a blood count revealed that the erythrocytes numbered 1,200,000 per cubic millimetre and the hæmoglobin value was 7.0 grammes per 100 cubic centimetres; 60 nucleated erythrocytes were seen in every 1,000,000 erythrocytes. A transfusion of four ounces of Rh-negative citrated blood was given. The next day the

erythrocytes numbered 3,640,000 per cubic millimetre and the hæmoglobin value was 13.0 grammes per 100 cubic centimetres. By the time the baby was one month old the jaundice was fading, and by September 20 the jaundice had gone. At the time of the meeting the baby was eight and a half months old. He was receiving six grains of ferrous sulphate per day. Up to the age of two weeks he had been fed on whey and skimmed lactic acid milk, and from then on he had been breast fed. The mother's blood was Rh-negative, the father's Rh-positive and the baby's Rh-positive.

Dr. Winning next showed a female patient, aged fourteen months, whose birth weight was seven pounds 13.5 ounces. None of the previous children in the family had been jaundiced. The patient was noticed to be jaundiced on February 26, 1943, the day after birth; but she was not lethargic. On February 28 head retraction was present, but the child was still energetic. On March 7 she was lethargic, and purulent conjunctivitis was present. On March 8 a blood transfusion was given. By April 5, 1943, the erythrocytes numbered 3,820,000 per cubic millimetre and the hæmoglobin value was 11.7 grammes per 100 cubic centimetres.

Dr. Winning finally showed a female infant who had been born on April 4, 1943, and admitted to hospital on April 9. She was the third child of the family; the previous children were alive and well, and had not been jaundiced. The present infant had been noticed to be jaundiced at the age of two and a half days. On examination, she was seen to be of an orange colour. Neither the liver nor the spleen was palpable. On April 9 a blood count revealed that the erythrocytes numbered 2,970,000 per cubic millimetre and the hæmoglobin value was 11.3 grammes per 100 cubic centimetres; no nucleated erythrocytes were seen. On April 10 a transfusion of four ounces of Rh-negative citrated blood was given. By April 14 the jaundice was less deep, and on April 17 the child was of a pale greenish-yellow colour, energetic, and taking food well. By May 6 the jaundice had disappeared, and by May 15 the child was home and gaining in weight. At the time of the meeting the child was twelve months old. She had been given six grains of ferrous sulphate per day. Up to the age of two weeks she had been fed on whey and skimmed lactic acid milk, and from then on she had been partly breast fed. The mother's blood was Rh-negative, the father's Rh-positive and the baby's Rh-positive.

An Abdominal Tumour for Diagnosis.

DR. N. C. CUNNINGHAM showed a female child, who two months earlier had been subjected to operation for an acute abdominal lesion. At the operation a subperitoneal extravasation of blood was found along the posterior surface of the transverse and ascending colon. An extravasation of blood was also found across the right renal and pancreatic areas. Since the operation the child had been intermittently passing dark blood *per rectum*. Blood and pus had been present in the urine for several months. The urine was slightly alkaline and contained a trace of albumin, but no erythrocytes. A blood examination gave the following information: the erythrocytes numbered 3,600,000 per cubic millimetre, the hæmoglobin value was 11.8 grammes per 100 cubic centimetres, the colour index was 1.1 and the corpuscular index was 72; less than 0.5% of the erythrocytes were reticulocytes, and no nucleated red cells were seen; the mean corpuscular hæmoglobin concentration was 32.7 $\gamma\gamma$; the cells were full and equal to normal in size and shape. The leucocytes numbered 7,600 per cubic millimetre, 75% being neutrophils, 22% lymphocytes, 1% monocytes, and 2% eosinophils, whilst 450,000 thrombocytes were counted per cubic millimetre. Dr. Cunningham said that the provisional diagnosis was one of Henoch's purpura associated with a large intraabdominal blood clot. The child was to be further investigated.

Exfoliative Dermatitis.

DR. G. NORRIE showed a male patient, aged eight years, suffering from exfoliative dermatitis. The boy had been admitted to hospital on February 11, 1944, with a history of eczema of four years' duration; the whole of the body, the limbs, the head and the face were affected. The lesion cleared up temporarily with treatment, but recurred. On examination, the child was seen to be completely covered with a rash from head to foot, and he was constantly pyrexial. Dr. Norrie said that the skin was treated with *Pasta Zinci*, and the child had for several weeks been given sulphanilamide by mouth, and had had blood transfusions. His general condition and the condition of the skin had both improved.

(To be continued.)

Correspondence.

POLYARTHRITIS IN THE NORTHERN TERRITORY.

SIR: An excellent description of an epidemic of Northern Territory polyarthritis by Halliday and Horan appeared in THE MEDICAL JOURNAL OF AUSTRALIA of October 9, 1943.

I thought it would be of interest to give a few brief details of a similar epidemic which occurred in the Northern Territory during November and December, 1943.

Some forty cases were admitted to an Australian general hospital in the Northern Territory during that time and 25 sporadic cases have been admitted since, between January 1 and April 1, 1944.

In most cases the syndrome followed that described by Halliday and Horan.

Topography.—The majority of the cases occurred within a radius of thirty miles of the Adelaide River area. A few sporadic cases were scattered between Darwin and Larrimah.

Incubation Period.—As two of the men developed their illness within ten days of their arrival in the Northern Territory, it may be assumed that the incubation period is less than ten days.

Prodromata.—A feeling of apathy and perhaps some slight malaise for twelve to twenty-four hours was a constant feature.

Rash.—Generalized diffuse erythematous maculo-papular rash was evident in all but very mild cases; its features conformed to those described by Halliday and Horan.

Lymph Glands.—Significant enlargement of lymph glands occurred in most cases.

Joints.—A feeling of stiffness in the affected joints was noted twenty-four hours before the onset of malaise. Large joints usually presented an effusion, small joints periarticular swelling. Joints usually affected were ankles, knees, wrists and finger joints. Large joints usually subsided after three or four days, whilst the periarticular swelling of the finger joints persisted for about two weeks. Some pain on movement of affected joints persisted for one to four weeks with occasional stiffness lingering on for longer periods.

Central Nervous System.—A subjective hyperaesthesia of the finger tips, heels and soles was common during the initial days. Many men described the tenderness of their finger tips as a feeling of "splinters", and one man attempted to remove the "splinters" with a needle. Several men found it necessary to place rubber pads under their tender heels for a day or two before admission.

Temperature and Pulse Rate.—The elevation of temperatures was of a very mild degree, usually less than 100°, and rarely persisted more than forty-eight hours, no secondary elevations of temperatures were noted, and there was no undue slowing of pulse rate during the defervescence of the fever.

Leucocyte Count and Blood Sedimentation Rate.—The total and differential leucocyte count was usually within normal limits. There was a moderate elevation of the blood sedimentation rate during the first week of the disease, which fell to normal levels within seven to ten days.

Occasionally a classical rash or generalized enlargement of lymph glands was the only obvious manifestation. Such cases were probably minor mutations of the syndrome. Joint involvement did not occur in every case.

To summarize, the four major signs are: (i) typical joint involvement, (ii) typical rash, (iii) hypersensitivity of distal parts of extremities, (iv) lymph glandular enlargement.

Yours, etc.,

LOUIS HARRIS,
Captain, Australian Army
Medical Corps.

April 26, 1944.

THE FEE PRINCIPLE AND MEDICAL ORGANIZATION.

SIR: At the risk of being accused of drawing across the trail of Dr. Arthur E. Brown's excellent article on medical organization one of those red herrings which he "refuses to follow", I must comment on one paragraph in his paper. He says: "It should not be possible for anyone to be told, as I was told a short time ago: 'No, we do no blood urea estimations here, but we do a lot of prostatic surgery!'" The inference is obvious, that no one should be permitted to do prostatic surgery, unless he has blood urea estimations done. As one who does "a lot of prostatic surgery", I have no hesitation in saying that I never use blood urea estima-

tions now, having abandoned them years ago, as I found that they were of very little value in estimating the suitability of a patient for operation. In a discussion on prostatectomy, held in Melbourne on the occasion when the British Medical Association held its annual meeting there, I put forward this statement, thinking that it might provoke some discussion, but there appeared to be general agreement that other tests were of more value than the blood urea estimation, and Mr. Clifford Morson stated that he had abandoned the test years before. I should feel very aggrieved if, under a scheme of nationalized medicine, I were to be ordered, by some such official as Dr. Brown proposes, to do tests which, in my opinion, were no longer of any value, and it is this fear of bureaucratic interference which is at the root of just as much of the opposition to a nationalized system of medical practice as is produced by a fear of loss of income. Dr. Brown may reply that in the army medical service the scheme has worked well, but I would reply that that scheme is functioning under the control of men who, until five years ago, were practically all engaged in private practice. Had the interval been twenty-five years instead of five, the success of the scheme might not be so apparent.

Yours, etc.,

G. H. BURNELL.

85, Hutt Street,
Adelaide,
May 28, 1944.

MODE OF ACTION OF PENICILLIN.

SIR: In all accounts that I have read to date concerning this wonder working remedy (is the word drug sufficiently defined to apply?) its mode of action is referred to as being unknown.

Perhaps it is not as unknown as the literature suggests. However, it is common to hear both the man in the street and the doctor in his surgery refer to it as mysterious as well as wonderful.

Wonderful it certainly is, but every doctor knows, or did know in his student days, two very relevant facts. (i) "Bacterium cells have each a distinct cell wall either of cellulose or a chitinous substance." (ii) Certain fungi, among which is the penicillium group, "have the power of penetrating and disorganising cell walls by virtue of a ferment secreted by their hyphae which acts on cellulose". I quote from Lowson's "Text Book of Botany", sixth edition.

I need say no more. The key to the mystery is here. On the one hand the cellulose-guarded protoplasm that works the havoc of disease, and on the other hand the cellulose destroying ferment to disorganize and disintegrate, to rob it of its very existence.

It has remained to this late date for medical science to apply these long known facts and sound the doom of the cellulose protected bacteria. Perhaps it is not too much to hope that some similar ferment or other substance will soon be found that will have an equally destructive effect on the bacterium groups protected by a chitinous cell wall. The field of research is now more precise and the lines of least resistance more clearly defined than ever before.

Yours, etc.,

A. E. PANTING.

Broken Hill,
New South Wales,
May 25, 1944.

Obituary.

EDWARD ALAN MACKAY.

We are indebted to Dr. Colin Macdonald for the following appreciation of the late Dr. Edward Alan Mackay.

When a house surgeon at the Children's Hospital, Melbourne, I first came into contact with Alan Mackay, and almost immediately fell under the spell of this wise and gentle spirit with whom I was to enjoy a happy association for over twenty-five years. The Children's Hospital then, as now, was a most happy abode. In addition to Alan Mackay, the staff included such admirable personalities as Jeffreys and Atkinson Wood, Hobill Cole and his son-in-law Harry Stephens, and Stewart Ferguson; Reginald Webster was already well established as an authority on children's pathology, and its superintendent was Kingsley Norris, a gifted clinician whose agile wit and wisdom quickly resolved

many difficulties for his four juniors. They were exceedingly good times, and Alan Mackay's operating and visiting days were amongst their happiest hours; nothing ever ruffled his kindly equanimity, and he was at great pains to allow his residents to develop a professional confidence; he was most generous to them with operative surgery, and offered suggestions for treatment or technique so courteously and helpfully that even a long hot summer's morning in the theatre passed much too quickly.

In addition to medicine, which he practised with such distinction and devotion—he was a father confessor to the fashionable suburbs of Toorak and South Yarra for a long lifetime—Alan Mackay had three other interests, expressed in a love of the Victorian pastoral soil and of the Scotland of his forebears, as well as a staunch attachment to the Melbourne Grammar School and the closely linked Trinity College of our university.

He was a keen supporter of the Historical Society of Victoria, as might be expected, for the early history of this State was in his blood, both from his father and his mother's side; his father, Dr. George Mackay, had settled at The Grange, Tarrawingie, in the north-east of Victoria, as early as 1838, at about the same time as those other overlanders, the Faithfull brothers, the Reverend Joseph Docker of Bontherambo, David Reid of the Hermitage, and Dr. Bowman of Bowman's Forest. In a letter to Governor La Trobe in 1853, George Mackay wrote that he arrived on the Owens River in March, 1838, on the evening of the day of the long-remembered massacre by natives of a section of the Faithfull party. He also told that although the natives were not numerous, they were very hostile, and that after the Faithfull Creek murders, panic seized the stockmen of the district and they deserted their employers. Mackay was left with only three assigned servants who also threatened to abscond, so he was forced to leave the Owens district and take his stock northwards to the Hume River (now the Murray). But he returned some months later and his eventual home was The Grange, Tarrawingie; it remained associated with the Mackay name until about twenty years ago. Dr. Alan Mackay and his brothers, in memory of his father and other overlanding pioneers, established a lecture which is given annually at Wangaratta. His father had come from Caithness in the far north of Scotland, and Alan always maintained, in his quiet convincing way, that to the industry, thrift and morality of the Scottish pioneers who had settled as pastoralists before the gold rush, much of the success of the Australian pastoral industry could be attributed. It is noteworthy that before the gold rush in 1851, every part of the colony of Victoria suitable for grazing had been occupied. The white population had reached 75,000 and Port Phillip had in fact become the most flourishing outpost of the British Empire. The prosperity of the colony rested upon its pastoral production, and the pioneers had performed a work of colonization which, for value and completeness, as has been truly written by Billis and Kenyon (friends of the subject of this memoir), history furnishes no parallel. There had been no government grants or other acts of encouragement to develop the country; indeed obstacles were placed in the paths of the first settlers, who, in the eyes of the authorities in Sydney, were intruders occupying the lands of the Crown without right or permission. Isolation, floods, fires, droughts, destruction of stock by natives, wild dogs and disease, and frequently unpayable prices were the adversities of the squatter, but these were considered problems to be overcome by his own courage and resources. Most of the new settlers failed financially, and many left the country; the remaining few succeeded and some of these amassed fortunes, such as to invest the term "squatter" with a new meaning. But too often it is forgotten, as Alan Mackay frequently emphasized, that only the stoutest of hearts, aided by good fortune, survived the many heart-breaking setbacks of our early pastoral history. To the Section of Medical History (unhappily now defunct) of the Victorian Branch of the British Medical Association he delivered its inaugural address on "Medical Pastoralists of Victoria"; this notable contribution appeared in THE MEDICAL JOURNAL OF AUSTRALIA on October 13, 1934.

He was always a most welcome and honoured visitor at Scottish societies and gatherings in Melbourne, sometimes wearing the dark green Mackay kilt (which sat surprisingly well on his tall, slight and spectacled figure), and invariably helping to foster what was best in the Scottish culture and tradition; his patronage ensured that these mustering would be free from any spurious or maudlin sentiment. He sincerely believed that his kinsmen would be all the better Australians if they knew and remembered something of the Scotland whence they or their parents had sprung.

From Tarrawingie he was sent, in 1877, when aged fourteen, to the Melbourne Grammar School, four brothers having preceded him thither, and for his old school he retained a marked affection. Elected president of the Old Melburnians in 1923, he followed Mr. Stanley M. Bruce in that distinguished office. He entered the school in the same year as Walter Coldham, the eminent barrister, Thomas Milleard, the western district pastoralist, and Francis Cumbrae-Stewart, later to be professor of law in the University of Queensland. Edward Morris was his headmaster; he had just missed Dr. Bromby. It was Dr. Edward Bromby, of Grammar, and Dr. Alexander Morrison, of Scotch College, who were really the founders of the Victorian public school system, and they exercised over many years a profound influence on secondary education in this State. Alan was a prefect at Grammar and later, during his medical course, went into residence at Trinity College, where, in 1884, he won the Warden's Scholarship. Those were the days when Dr. "Bones" Leeper, one time of Trinity College, Dublin, and Cambridge, and the first warden of Trinity, Melbourne, was at the height of his academic and dialectical powers, and many were the stories that Alan could tell of the young men of Trinity and of Ormond, where John MacFarland was laying equally surely the foundations of another great residential college. A delightful raconteur, who believed that indelicacy need not be an ingredient of a good story, Alan possessed a narrative manner all his own, the finale usually being a most infectious chuckle; there were few subjects he could not discuss, and in doing so, illuminate. He knew everybody, or almost everybody, and I have never heard from any lips anything but good of Alan Mackay. He was a unique personality—so gentle and kind, yet so shrewd in his judgement of men and events. If he could not commend, he would withhold criticism, but not always, for he could be very firm on occasions, and I have seen him moved to warm indignation by expressions of disloyalty to Australia or the Empire, or by vulgarity or ostentation in any form.

Many men later to be eminently successful graduated from the Melbourne Medical School during the eighties of last century, but none practised medicine with greater integrity or distinction than Alan Mackay. If honesty, kindness of heart and gentleness of spirit remain virtues in the world of tomorrow, then his name should not be forgotten in the medical history of Victoria.

Dear old Alan—for such was the affectionate name by which he was known to all his juniors—many of us know we shall never see his like again.

ROY WILLIAM CHAMBERS.

A GENERAL PRACTITIONER from Essendon, Victoria, who wishes to remain anonymous, has sent the following appreciation of the late Dr. Roy William Chambers.

Eleven years ago when I first commenced general practice my greatest fear was that I should have a midwifery case which was too difficult. I soon found that I had a good friend and capable surgeon to whom I could entrust my difficulties. In my earlier years while I was gaining confidence Dr. Roy Chambers never failed to come as quickly as possible to my call for aid and relieve my great anxiety. I am sure that I am only one of many. In my own particular practice I found that his judgement was unerring and that whatever he advised turned out excellently for the patient. In later years Dr. Chambers performed many gynaecological operations for my patients; they all did extremely well, and in this district he was apparently known far and wide. Since his death I have had many expressions of sorrow from former patients.

As a consultant he must have been ideal; he gave the impression always that he was acting with you, and he brought confidence not only to the patient but also to the doctor. I never knew him to shirk the most difficult cases and he was always ready to try to meet the financial needs of the patient. In Dr. Roy Chambers I feel that I have lost a good friend, a wonderful consultant and a generous surgeon.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 109, of June 1, 1944.

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Reserve.

Termination of Appointment.—The appointment of John Anthony James as Surgeon Lieutenant is terminated, dated 3rd October, 1943.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

Temporary Squadron Leader L. B. Cox (1179) is granted the acting rank of Wing Commander whilst occupying a Wing Commander post with effect from 1st April, 1944.

Reginald Eric Buckingham, M.B., Ch.M., F.R.C.S., D.L.O. (267680), is appointed to a commission on probation with the rank of Flight Lieutenant for part-time duty with effect from 6th March, 1944.

Reserve: Medical Branch.

The undermentioned Medical Practitioners are appointed to commissions on probation with the rank of Flight Lieutenant with effect from the dates indicated: Stevens Dimant, M.B., B.S. (257632), 26th February, 1944, Henry Seamonds, M.B., B.S. (267692), 8th March, 1944.—(Ex. Min. No. 152—Approved 31st May, 1944.)

CASUALTIES.

ACCORDING to the casualty list received on June 6, 1944, Major J. D. Palandri, A.A.M.C., Mount Lawley, Western Australia, who was previously reported to be a prisoner of war, is now reported to have been repatriated.

Notice.

THE following is the programme of the clinical meeting to be held at Broughton Hall Psychiatric Clinic, Leichhardt, New South Wales, on Thursday, June 15, 1944, preliminary notice of which has been given in these pages:

1. Series of cases illustrating stages and types of chronic progressive chorea.
2. Case of amyotrophic lateral sclerosis with paraplegia inflexion.
3. Case of congenital *dementia paralytica* showing rapid reversal of serological findings.

Medical practitioners are invited to attend.

Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned has been registered as a duly qualified medical practitioner:

Cebon, Leon, M.B., B.S., 1944 (Univ. Melbourne), Launceston General Hospital.

QUEENSLAND.

THE undermentioned has been registered, under the provisions of *The Medical Acts, 1939 to 1940*, as a duly qualified medical practitioner:

Sürth, Egon, M.D., 1934 (Univ. Messina), A.A.M.C., attached 8th Emp. Company, Tocumwal, New South Wales.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Cahill, John Bareham, M.B., B.S., 1939 (Univ. Sydney), 91, Old South Head Road, Bondi Junction.
 Spence, Laura Waring, M.B., 1933 (Univ. Sydney), 19, Murdoch Street, Cremorne.
 Blaxland, George Frederick, M.B., B.S., 1943 (Univ. Sydney), 36, Eastern Road, Turrumurra.
 Bonnette, Ronald Howard, M.B., B.S., 1941 (Univ. Sydney), 1, Baden Powell Street, Artarmon.

Diary for the Month.

- JUNE 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 JUNE 13.—Tasmanian Branch, B.M.A.: Branch Meeting.
 JUNE 16.—Victorian Branch, B.M.A.: Ethics Subcommittee.
 JUNE 19.—Victorian Branch, B.M.A.: Hospital Subcommittee.
 JUNE 19.—Victorian Branch, B.M.A.: Finance Subcommittee.
 JUNE 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 JUNE 20.—Victorian Branch, B.M.A.: Organization Subcommittee.
 JUNE 21.—Western Australian Branch, B.M.A.: Branch Meeting.
 JUNE 22.—New South Wales Branch, B.M.A.: Branch Meeting.
 JUNE 22.—Victorian Branch, B.M.A.: Executive Meeting.
 JUNE 22.—Queensland Branch, B.M.A.: Council Meeting.
 JUNE 27.—New South Wales Branch, B.M.A.: Ethics Committee.
 JUNE 28.—Victorian Branch, B.M.A.: Council Meeting.
 JUNE 29.—New South Wales Branch, B.M.A.: Branch Meeting.
 JULY 4.—New South Wales Branch, B.M.A.: Council Quarterly Meeting.
 JULY 5.—Victorian Branch, B.M.A.: Branch Meeting.
 JULY 5.—Western Australian Branch, B.M.A.: Council Meeting.
 JULY 7.—Queensland Branch, B.M.A.: Branch Meeting.
 JULY 7.—Victorian Branch, B.M.A.: Legislative Subcommittee.
 JULY 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

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